THE IRON TRADE REVIEW

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HOLIDAY LULL

HAS NOT DISTURBED FIRMNESS OF THE MARKET.

Independents Get a Large Share of Structural Orders of the Year—Buying of Basic in the East.

Although the usual holiday dullness is being experienced, the market is not weak anywhere. Since the tariff controversy became animated, a considerable falling off in specifications on steel products has been noted. The starting of one furnace at the great plant at Gary, Ind., Dec. 21, marks the beginning of manufacturing at that new industrial center.

Structural Material

With the year's business practically ended, some interesting statistics on the structural material market are available. The American Bridge Co. delivered about 350,000 tons, and contracts for about 200,000 tons are being carried over into the new year. Independent interests turned out about 800,000 tons of structural material, principally on orders booked during the year, as the tonnage carried over was not large. The American Bridge Co. will furnish the 11,000 tons of steel required for the Chicago city hall. Other contracts include the Hermitage hotel, Nashville, 1,000 tons to the Smead Architectural Iron Works, Louisville; White building, Seattle, 1,000 tons, to Milliken Bros., and the Cosmopolitan Electric Co. building, Chicago, 1,200 tons, to the Morava Construction Co.

Pig Iron Conditions

The principal sales of pig iron were 20,000 tons of basic to an eastern Pennsylvania steel plant by a New Jersey furnace company, about 15,000 tons of basic in eastern territory to other consumers, and 6,000 to 7,000 tons of foundry to the American Car & Foundry Co., by a Toledo furnace. A leading plumbing interest is inquiring for 4,000 tons, and there is some inquiry for basic at Chicago. The trade, generally speaking, is quiet but firm.

Railroad Buying

It is officially announced that the Virginian railroad contract for 1,500 steel cars has been taken by the Pressed Steel Car Co. The Lackawanna railroad has ordered 500 box cars and 300 steel hoppers from the American Car & Foundry Co., and the New Orleans-Great Northern has contracted for 300 steel under-frame box cars from the Standard Steel Car Co. Considerable steel car business is under negotiation and likely to be placed early in the year.

Bars and Tin Plate

Tin plate specifications were the heaviest the past week of any week since the summer of 1907. Some important interests have enjoyed an excellent steel bar business during the year, the shipments in the case of at least one company being ahead of those of last year. A number of sales of axle billets are reported, and other inquiries are pending.

Large Stocks of Scrap

A careful estimate shows accumulations of old material in dealers' hands, held for higher prices, amounting to over 600,000 tons, nearly 500,000 being in the Chicago district, where three dealers have 350,000 tons. One dealer who transacts business in several cities has 200,000 tons, and has bought heavily in New England. These accumulations are probably due to a large extent to the expected demand from the Gary mills, but whether this demand will be equal to expectations is doubtful. The scrap market is now showing some signs of weakness, although quotations in only a few cases are lower.

GARY'S FIGURES

ON STEEL CORPORATION'S COSTS ON ITS OWN PRODUCTS.

Tells Why Corporation Might Worry Along Without Tariff—Might be Ruinous to Competitors—Foreign Dumping.

Judge E. H. Gary, chairman of the board of directors of the United States Steel Corporation, appeared before the ways and means committee of congress, Dec. 18, and gave testimony on the iron and steel tariff schedules in reply to questions asked by Chairman Payne and other members of the committee.

Judge Gary testified that he had been five years chairman of the board of directors and two years chairman of the finance committee of the United States Steel Corporation. The corporation owned the shares of various concerns producing iron and many different lines of steel. It also mined ore and coal and made coke and owned shares of railroads and steamship companies. The chief lines of iron and steel produced were ten or eleven million tons of pig iron and ten or eleven million tons finished steel, including rails, structural steel, wire and wire products, of many kinds, tubes, tinplate, rails, blooms, billets, bars, shapes, cotton ties, rods and products, sheets, angle and splice bars, rivets, axes, wheels and other items, spelter, sulphate of iron and large quantities of cement. The ore properties were in the Lake Superior district, Georgia, Tennessee and Alabama regions. The cost of mining ore in the Lake Superior region was 73 cents per ton, or $1.43 per ton including mining expense, depreciation and royalty. This was calculated on the basis of what it would cost to restored depleted capital.

Great Northern Ore Deal.

In the Great Northern deal the company paid 85 cents a ton for ore up to 59 per cent. If properties such as those now owned there were for sale the charge would be much higher. But 40 cents was a fair depreciation allowance on the basis of original cost. About $1.45 must be allowed for transportation to the lower lake ports. At Chicago the ore was landed direct at the Illinois Steel Works. In the Tennessee region the cost to produce ore could not be stated. The cost of pig at Birmingham was about the same as at South Chicago. The manufacturing cost was about $14.75 or $15. This gave no credit for any profit to the Steel Corporation on the investment in the mines, railroads or ships. The Bethlehem company could not beat this. The cost was a trifle more, perhaps 15 cents, now than in 1906, beside extra cost of materials, as wages had risen a little. The rate of $14.75 included depreciation, administrative charges, overhead costs, etc. Mr. Schwab's estimate did not take these into account. Forty cents a ton must be allowed the blast furnace for depreciation.

This estimate was carefully made and was intended to represent the actual rate of depreciation. Manufacturers, as a rule, have not taken enough depreciation charges to keep up their properties. The elements of average cost to make pig iron at the $14.75 were: Iron ore, $4.70 at furnace, or $8.62

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THE WEEK IN IRON CENTERS

PITTSBURG.

Pig Iron Market Lifeless—Some Increase of Mill Activity.

Office of THE IRON TRADE REVIEW,
510 Park Bldg., Dec. 22.

Although a lull has fallen upon iron and steel buying with the coming of holiday and inventory activities, consumers are keeping in close touch with all movements of the market and are holding out to makers the expectation of an improved trade soon. Generally there is a disposition to look with encouragement toward the spring season and to shape policies in the anticipation of a moderate revival of business at that time.

One element of uncertainty and doubt in an otherwise fairly optimistic outlook, is furnished by current speculation upon the probable revision of the tariff on iron and steel products and its attendant effects. While it is not expected that any radical consequences are likely to arise from such action, the speedy elimination of this factor of doubt would be welcomed as a further clearing of the way for future improvement. The progress of these hearings is exciting keen interest among both manufacturers and consumers.

An interesting phase of the situation is presented in the increased inquiry for foreign material now coming to importers. While actual purchases of English or German products by American consumers are not of significant volume, the greater interest being displayed is taken as emphasizing the general idea of buyers to carefully scrutinize all markets under present conditions and to take advantage of exceptional opportunities offered by the world-wide trade depression. Seaboard quotations generally being asked are those on pig iron from England and rods and slabs from Germany.

As the year is closing, some of the plants which have been idle throughout the depression are getting under way again. The Carnegie Steel Co. has started its Mingo works at partial capacity and the American Steel & Wire Co. shortly after Jan. 1 will resume operations at one blast furnace and half of its open-hearth furnaces at its Donora plant. Of the 18 merchant blast furnaces in the Mahoning and Shenango valleys 10 are now in operation and most of the remaining stacks are now idle through repairs being made upon them, preparatory to active campaigns.

Pig Iron.—In all grades of pig iron, a lifeless state is at hand. Melters, having covered for a fair proportion of their requirements over the near future, are merely watching the course of the market, keeping in touch with it by an occasional inquiry. Firmness in quotations continues.

This condition is leaving the market without definite ruling prices and wide variations are shown. A sale of 800 tons of No. 2 foundry for first half, to a melter within valley competitive territory, is reported at $15.50 furnace or $16.40 delivered. A lot of 250 tons of No. 2, both seller and buyer being located without the valley district, brought $16 furnace, but was made in competition with furnaces which are holding for relatively very high prices. Carload spot sales were made this week on a basis of $15.65 furnace.

The largest inquiry for steel-making iron is for 8,000 tons of basic for a Chicago user, delivery for the first four months being specified. There is no activity in Bessemer beyond very small lots, principally carloads. Some malleable is moving at from $15.50 to $16 valley. It is reported that a large block of forge iron is under negotiation.

Operations in the Mahoning and Shenango valleys, including the Dover stack, show 10 furnaces active and eight idle, one being banked. The going list includes three Shenango, Cherry Valley, Dover, Stewart, Mary, Grace, one Hubbard and Girard, and the furnaces inactive are Struthers, one Hubbard, Claire, Ella, Sharpsville, McKeefrey and Tod, while Fannie is banked. The rebuilt Kittaning and Scottdale stacks will blow in shortly after Jan. 1, the former Jan. 2. Struthers furnace will also resume soon.

The southern situation is strong throughout. Several of the makers, having booked large tonnages, are now considering an advance of their prices to $13.50 Birmingham for No. 2, which will be equivalent to withdrawing from the market. It is reported that this price is already being asked in some cases. On prompt and first quarter shipment on northern iron, we quote as follows:

Bessemer, valley	$16.50 to 17.00
Bessemer, Pittsburg	17.40 to 17.90
No. 1 foundry, Pittsburg	16.90 to 17.40
No. 2 foundry, Pittsburg	16.25 to 16.90
Gray forge, Pittsburg	15.40 to 15.90
Basic, valley	15.50 to 16.00
Basic, Pittsburg	16.40 to 16.90

Ferro-Alloys.—Considerable negotiation is under way in ferro-alloys and the market is firm. We quote 80 per cent ferro-manganese at $44.50 to $45.50, seaboard, with a freight rate of $1.95 to Pittsburg, the lower quotation applying to prompt delivery.

Imported 50 per cent ferro-silicon is quoted $63.50 to $64 Pittsburg on forward deliveries; domestic 12 per cent, $28; 11 per cent, $27; 10 per cent, $26, Pittsburg. Imported lower grades of ferro-silicon range lower than domestic.

Plates.—Rolling orders in plates are heavier and the mills in this district have better operating schedules. The Homestead works of the Carnegie Steel Co. are producing considerable tonnage for the National Tube Co. and other subsidiaries of the United States Steel Corporation. The Carnegie Steel Co. has about completed the rolling of the 5,000 tons of plates required for the Springfield, Mass., riveted pipe contract, and will soon start upon the order for 19,000 plates for the Brooklyn waterworks improvement. The Jones & Laughlin Steel Co. is receiving specifications for boat and steel car contracts recently placed. Favorable bookings are reported by makers of steel wheels. The New Orleans-Great Northern railway has ordered 300 30-ton steel underframe box cars from the Standard Steel Car Co. There is some shading in plate prices. We quote officially:

Tank plate, ¼-inch thick, 6¼ to 100 inches, 1.60c f. o. b. mill Pittsburg. Extras are as follows per 100 pounds; Boiler and flange steel plates, 0.10c; A. B. M. A. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.30c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches, excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end not being less than 30 inches, 0.10c; circles, 0.20c. Plates in widths over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1c. Gages under ½-inch to and including 3/16-inch plate on thin edges, 0.10c; under 3/16 to and including No. 8, 0.15c; under No. 8 and including No. 9, 0.25c. Five cents extra for less than carloads. Terms, net cash in 30 days.

Sheets.—Good indications for spring orders are present in the sheet market,

but the situation is quiet at this period. Black and galvanized sheets are moving at about the same gait. Although there is an improvement in this respect, shading of prices is still current. The American Sheet & Tin Plate Co. increased its operations this week to 112 mills or 60 per cent. We quote official prices as follows:

Blue annealed sheets, No. 10 and heavier, 1.80c; Nos. 11 and 12, 1.85c; Nos. 13 and 14, 1.90c; Nos. 15 and 16, 2c; box annealed, Nos. 17 to 21, 2.25c; Nos. 22 to 24, 2.30c; Nos. 25 and 26, 2.35c; No. 27, 2.40c; No. 28, 2.40c; No. 29, 2.60c; No. 30, 2.70c; galvanized sheets, Nos. 10 and 11, 2.45c; Nos. 12 and 14, 2.55c; Nos. 15 and 16, 2.65c; Nos. 17 to 21, 2.80c; Nos. 22 and 24, 2.95c; Nos. 25 and 26, 3.15c; No. 27, 3.35c; No. 28, 3.55c; No. 29, 3.70c; No. 30, 2.95c; corrugated roofing, $1.75 per square for No. 28 painted, 2½-inch corrugation, and $3.10 per square on galvanized roofing, 2½-inch corrugation, No. 28.

Jobbers are allowed $1 a ton from these prices.

Tin Plate.—The leading interest the past week received the heaviest volume of specifications of any week since the summer of 1907. The fish packers of the Pacific coast are now practically all under contract, and estimated requirements meet the full expectations of manufacturers. Some of these packers are already ordering in maximum quantities for first quarter delivery. The mills of the independents are working consistently at satisfactory schedules. The operations of the leading interest declined to 105 mills this week, or 44 per cent, 23 mills at the Laughlin works and seven mills at the Chester works having been taken off for repairs and inventories. These mills will resume early in the new year. We quote official prices:

Coke tin plate, 100-pound basis, 14 x 20, $3.70 f. o. b. mill Pittsburg district. Terms, 30 days, less 2 per cent for cash in 10 days.

Rails and Track Material.—Of the allotment of 62,500 tons made to the United States Steel Corporation from the Pennsylvania railroad contract, 35,000 tons will be rolled by the Carnegie Steel Co. and 27,500 by the Illinois Steel Co. Though the contract is officially closed, the time of delivery and other details remain to be fixed, but these are expected to be settled within a very short time. Among the other rail orders which indications point to being placed at an early date, is that of the Baltimore & Ohio, requirements of which are estimated at about 90,000 tons. The Pittsburg & Lake Erie will also contract for about 10,000 tons. The traction companies are coming into the market more freely for small tonnages, the local maker having booked a number of orders of this class including one for 660 tons. Light rail orders this month are very satisfactory and will exceed those of November. Makers are not disposed to contract for any extended deliveries in this market. Competition of the rerolling mills continues spirited. There has been some buying of spikes in connection with rail contracts, but inquiries from one road for 25,000 kegs and for 12,000 kegs from another are still pending. On present specifications on Bessemer rails we quote as follows, the base price for open-hearth rails being $30 mill:

Fifty-pound and heavier, 500-ton lots and over, $28; carloads and less than 500 tons, $30; less than carload lots, $32; 8-pound, $32; 12-pound, $29; 16-pound, $27; 20-pound, $26; 25 to 45-pound, $25; angle splice bars for standard sections, $1.65; standard spikes, $1.70 to $1.80 Pittsburg; hand spikes, $1.80 to $1.90 Pittsburg.

Steel.—The tonnage of billets and sheet bars moving to consumers against contracts has shown an encouraging increase during the past several months, and is now quite favorable. Some large interests are not soliciting new business, which is of light volume. The Carnegie Steel Co. the past week started the blooming mill and the 4-inch billet mill at its Mingo works, Mingo Junction, O., and is rolling billets. The works are now operating at about 50 per cent of capacity, as the bar mill and combination mill are still idle.

Bessemer and open-hearth billets, base sizes, are quoted at $25 Pittsburg, and forging billets at $27 Pittsburg, subject to the division of the freight charge over $1 and not exceeding $3, and sheet and tin bars at $27.50 Pittsburg, valley and Wheeling territory, and $27 Pittsburg for delivery to other points.

Hoops and Bands.—There is no contracting as yet in hoops and bands for next year's delivery, but this is expected to come shortly after the beginning of January. Official prices are:

Hoops in carload lots, 1.80c; in less than carload lots, 1.90c; bands, 1.40c, base half extras as per standard steel.

Merchant Bars.—Although the general movement of steel bars in the country the past year was far below that of 1907, some important makers have enjoyed a consistent demand and will net an increase in shipments over the preceding year. Price shading in bars and merchant steel is less apparent. Specifications are fair. The railroads are taking on considerable bar iron tonnage for car repair purposes, and are paying full prices generally, as the market is holding firm. While most mills by independent action have recently advanced prices on account of the high level of scrap, some interests in the west are still holding to the former lower basis. Mills in this district are asking 1.50c base and are taking some contracts for outside delivery at full prices. The Republic Iron & Steel Co. this week is operating all its Youngstown mills practically full, with the exception of one small mill. The company has blown out its No. 2 Hazelton stack for re-lining, but all its other mill furnaces are in operation. We quote official prices:

Common iron bars, 1.50c Pittsburg in carload lots and over; 1.55c in less than carloads; 1.42c to 1.45c base Pittsburg, plus freight to point of shipment on western deliveries; Bessemer and open-hearth steel bars, 1.40c; plow and cultivator, 1.40c; channels, angles, zees, tees, under three inch, 1.50c, all f. o. b. Pittsburg. The following differentials are maintained on steel: Less than 2,000 pounds, 0.10c advance; less than 1,000 pounds of a size, 0.30c advance. Cold rolled and ground shafting, 57 per cent in car loads, and 52 per cent in less than carloads, delivered in base territory; open-hearth spring steel, 2.25c to 2.50c; sleigh shoe flats, 1.60c to 1.65c; smooth finished machinery steel, 1.90c to 2c; toe calk, 2.10c to 2.15c. Planished and machine straightened tire steel is 1.60c base. Iron finished tire under 1½ by ½ inches, 1.55c, plus ½ extra on tire card; iron finished tire, 1½ by ½ and over, 1.40c; plus ½ extra on the steel bar card.

On cold rolled strip steel, width 1½ inches and wider, and 0.100 inch and thicker, we quote base prices for 100 pounds, $3.35 on hard, and $3.60 on soft.

Structural Material.—Inquiries for structural projects are a little more plentiful, coming mainly from industrial enterprises and in some small extension work. The railroads have shown no increased interest. Fabricating prices are still irregular. The shape mills are receiving better specifications and some of the large works in this territory are running at 75 per cent of normal. W. N. Kratzer & Co. has taken a large contract for furnishing and erecting the steel work for eight buildings for the Kosmos Portland Cement Co., Kosmosdale,

Ky., which was recently destroyed by fire. The contract for the new plant of the Crane-Best Co., at Oakmont, Pa., bids for which went in a week ago, has not been awarded. A 10-story office building to be erected by the Second National Bank of this city will require about 1,000 tons. The undertaking is now in the hands of architects. We quote official prices as follows:

Beams and channels, 15-inch and under, 1.60c; over 15 inches, 1.70c; zees, 1.60c; tees, 1.65c; angles from 3 to 6 inches, 1.60c; over 6 inches, 1.70c; universal and sheared plates, 6¼ inches and wider, 1.60c base.

Merchant Pipe.—An important contract closed in the week is that of the T. N. Barnsdall interests for 25 miles of 16-inch pipe for a gas line in Ohio. The market is in a healthy condition, but is generally quiet. A number of projects are under consideration which will bring into the market requirements for a large amount of line pipe. The Ohio Fuel Supply Co. and associate companies are planning a gas line from West Virginia fields to near Columbus, O., which will be about 80 miles in length, and this undertaking is expected to reach the market soon. The National Tube Co. is closing the year with about 55 per cent of its welding furnaces in operation. We quote the following official base discounts subject to five off to jobbers:

	—Steel—		—Iron—	
	Black.	Galv.	Black.	Galv.
⅜ to 6 inches....	75	65	73	63

Boiler Tubes.—The market still remains rather uninteresting, but prospects are better. We quote the following official base discounts to the general trade on base sizes:

BOILER TUBES.

	Iron.	Steel.
2¼ to 5 inches.....	52	65

Wire Products.—Jobbers of wire products are giving the mills indications that they will freely come into the market for their needs in the early part of the new year. A healthy condition of trade is expected at the spring season. If any action on prices is taken, it is expected by the trade that it will come before this movement. The market at present is somewhat quiet. The American Steel & Wire Co., shortly after Jan. 1, will start six open-hearths and one blast furnace of its Donora plant, which is part of the capacity received in the recent transfer from the Carnegie Steel Co. The report that the South Sharon works will go on double turn is officially denied. We quote official prices as follows:

Wire nails, jobbers' carload lots, $1.95; retailers' carload lots, $2; painted barb wire, jobbers' carload lots, $2.10; retailers' carload lots, $2.15, with 30c for galvanizing; plain wire to jobbers in carloads, 1.80c; and to retailers in carloads, 1.85c.

Wire Rods.—While there has been some inquiries in the market by middle-men, new business is limited. We quote $33 Pittsburg on Bessemer and $34 Pittsburg on open-hearth rods.

Coke.—Probably 500 independent coke ovens which had been kept in idleness owing to the water famine have resumed operations with the improvement of conditions in the Connellsville region. Other plants which had been handicapped are now being worked at full schedules. A freer offering of prompt furnace coke and the appearance of several weak spots have resulted, some sales of standard grade being made around $1.70 ovens. A lot of about 2,000 tons was taken at a higher figure. The spot market is quoted at $1.70 to $1.80 ovens and on contract $1.90 to $2. There has been offering through middlemen of lower Connellsville foundry coke at prices considerably under the standard market, and this has caused some disquietness in the spot market. We quote standard Connellsville foundry coke at from $2.15 to $2.25 ovens and on contract from $2.25 to $2.50 ovens. For the week ending Dec. 12, the *Courier* reports capacity in blast of 21,333 ovens and 16,520 idle with a production of 244,309 tons the heaviest of the entire year 1908. The preceding week 20,257 ovens were active, 17,493 ovens inactive and the output was 235,211 tons.

Old Material.—The dealers having moved most of the purchased tonnage within the time they were obliged to, the freer offering of steel scrap is not so apparent and the former firmness of the market is being resumed. Turnings are in good demand, but borings are softer. No. 1 wrought shows little change. In keeping with the general tone of the market, the mill producers of some grades of scrap are advancing their asking prices on contracts for the material which they dispose of to the dealers. We quote gross tons delivered in the Pittsburg district as follows:

Heavy melting scrap, $16 to $16.50; re-rolling rails, $17.25 to $17.75; bundled sheet scrap, $13.50 to $14; iron axles, $23 to $23.50; old iron rails, $18.50 to $19; No. 1 wrought scrap, $17.25 to $17.75; old car wheels, $16.25 to $16.75; low phosphorus, $18.50 to $19; machine shop turnings, $12.50 to $13; cast borings, $11 to $11.50; No. 1 cast scrap, $14 to $14.50; malleable, $14.25 to $14.75.

CHICAGO.

Few Sales of Pig Iron—Old Material Weaker and Prices Declining.

Office of THE IRON TRADE REVIEW,
1328 Monadnock Block, Dec. 22.

Some inclination is displayed to attach to the market quiet of the past week or two a foreboding significance, to make of it a precursor of relapses in our industrial convalescence. There is no foundation for such opinions and for the most part a strong confidence underlies the situation. Transactions in all departments of the market last week were light, as is usual at this time in December. Reported pig iron sales aggregated about 7,500 tons, structural tonnage was light and there have been no new developments in rails. There is still some demand for axle billets and a few orders were placed. A 2,000-ton pipe contract was let at St. Paul. The scrap market is weaker with declining prices. A large tonnage of old material is being delivered by the railroads, but the demand from consuming mills is light.

Pig Iron.—Sales of pig iron during the past week have been comparatively few. The Holland Radiator Co. bought in the neighborhood of 4,000 tons of different grades, both northern and southern iron. The Cribben & Sexton Co., stove manufacturers, purchased 1,500 tons. One interest sold an aggregate of 1,400 tons of southern iron and the balance of the transactions were for small lots. The price is firm with a tendency on the part of some southern interests who have sold considerable iron in other territory to ask $13.50 for all future delivery. The ruling price in the south is $13 for No. 2 and in the north $17.50 delivered local plants. We quote as follows:

Lake Superior charcoal	$19.50
Northern foundry No. 1	18.00 to 18.50
Northern foundry No. 2	17.50 to 18.00
Northern foundry No. 3	17.00 to 17.50
Southern foundry No. 1	17.85 to 18.35
Southern foundry No. 2	17.35 to 17.85
Southern foundry No. 3	16.85 to 17.35
Southern foundry No. 4	16.35 to 16.85
Southern No. 1 soft	17.85 to 18.35
Southern No. 2 soft	17.35 to 17.85
Southern gray forge	15.60 to 16.10
Southern mottled	15.35 to 15.60
Southern silveries, 4 per cent silicon	18.10 to 18.60
Southern silveries, 5 per cent silicon	18.35 to 18.85
Southern silveries, 6 per cent silicon	18.85 to 19.35
Jackson Co. silveries, 6 per cent.	19.90
Jackson Co. silveries, 8 per cent.	20.40 to 20.90
Jackson Co. silveries, 10 per cent.	21.90
Malleable Bessemer	17.00 to 17.50
Standard Bessemer	17.65 to 18.15
Alabama Basic	17.35 to 17.85

Billets.—Manufacturers of axles continue to require moderate tonnages of axle billets and several sales of this character are reported. Allis-Chalmers Co. bought 500 tons of billets and another Milwaukee interest is in the market for 600 tons

deliveries to extend throughout the coming year. Quotations on current inquiries indicate that full prices are being asked uniformly. We quote as follows: 4 x 4-inch rolling billets, $26.50, and forging billets, $28.50, base Chicago.

Merchant Steel.—The railroads are pursuing the matter of contracting for bar iron through the first half of next year and several inquiries for varying tonnages are in the market, including one from the Illinois Central for from 4,000 to 8,000 tons. Current transactions are rather slow. One interest reports sales of about 2,500 tons of iron and steel bars during the week, distributed among wagon manufacturers, agricultural implement makers and bedstead manufacturers. The business in merchant steel was fair during the week. We quote as follows:

Bar iron, 1.50c to 1.53c; soft steel bars and bands, 1.58c, half extras; soft steel angles, less than 3 x 3, 1.68c; hoops, 1.98c base, full extras; planished or smooth-finished tire steel, 1.78c; iron finish, up to 1½ x ½-inch, 1.73c base tire card; iron finish 1½ x ½-inch and larger, 1.58c base steel card; channel for solid rubber tire, ¾ to 1 inch, 2.08c; and 1⅛ inch and larger, 1.98c; smooth-finished machinery steel, 1.83c; flat sleigh shoe, 1.63c; concave and convex sleigh shoe, 1.83c; cutter shoe, 2.95c; toe calk steel, 2.13c; railway spring, 1.93c base steel card; vehicle spring steel, 1.98 base vehicle card; crucible tool sheet, 7c to 9c, with higher prices asked on special grades. Quotations on shafting are 56 per cent off the list for carload lots, and 52 per cent off for less than carload lots, carload freight allowed to points in base territory. On iron and steel bars from local stocks, we quote as follows: Bar iron, 1.90c to 2c, full extras; soft steel bars, 1.80c per 100 pounds base, plus half extras; soft steel hoops, 2.30c, full extras.

Plates.—With respect to both tonnage and prices the plate situation fails to improve materially. With the exception of plates for railroad and structural uses, there is little demand. Concessions in prices of from $1 to $2 a ton seem to be more or less common and the individual orders rarely exceed 100 tons. We quote as follows:

Plates, ¼-inch and heavier, 6¼ to 100 inches wide, either universal or sheared, 1.78c Chicago. For extras see Pittsburg report. Jobbers' prices for shipment from local stocks are as follows: Tank steel, ¼-inch and heavier, up to 72 inches wide, 2c to 2.10c; from 72 to 96 inches wide, 2.10c to 2.20c; 3-16-inch up to and including 60 inches wide, 2.10c to 2.15c; 72 inches wide, 2.35c to 2.45c; No. 8, up to 60 inches wide, 2.10c to 3.15c. Flange and head quality, 25c extra.

Sheets.—Prices on light sheets from store have stiffened recently and some improvement in the demand is noted. Mill shipments are light, however, but prices appear to be quite firm. We quote as follows:

No. 10, 2.15c to 2.25c; No. 12, 2.20c to 2.30c; No. 14, 2.25c to 2.35c; No. 16, 2.35c to 2.45c; Nos. 18-20, 2.60c to 2.65c; Nos. 22-24, 2.65c to 2.70c; No. 26, 2.70c to 2.75c; No. 27, 2.75c to 2.80c; No. 28, 2.85c to 2.95c; No. 30, 3.25c. Galvanized sheets, No. 10 to 16, 3.05c to 3.10c; Nos. 18 to 20, 3.15c to 3.25c; Nos. 22 to 24, 3.30c to 3.35c; No. 26, 3.50c to 3.55c; No. 27, 3.70c to 3.75c; No. 28, 3.90c to 4.00c; No. 30, 4.40c to 4.50c.

Structural Steel.—The past week has not been productive of any very interesting transactions from the standpoint of tonnage; in fact, but few orders of any kind were placed. The contract for the 1,000 tons for the Hermitage hotel at Nashville, is understood to have been let, as was the contract for the White building in Seattle, also for 1,000 tons. It is not known with whom either of these contracts was placed. The leading fabricator received specifications on about 500 tons of railroad work and an order for 300 tons of steel for highway bridges. Inquiries are not of a very satisfactory character, there being apparently considerable uncertainty and indefiniteness about the placing of business. There is reason to believe that the sub-contract covering the steel for both the City Hall and the Hart, Shaffner, Marx building will be let within a few days. These contracts carry an aggregate tonnage of about 15,000. We quote mill prices Chicago delivery as follows:

Beams and channels, 3 to 15 inches, inclusive, 1.78c to 1.81c, delivered Chicago. For extras see Pittsburg report. Quotations from store are as follows for carload lots and over:

All angles, 3 inches and larger, including 6 inches, $1.95 per 100 pounds; angles over 6 inches, $2.05 per 100 pounds, base; beams, 3 to 15 inches, inclusive, $1.95 per 100 pounds base; channels, 3 inches and larger, $1.95 per 100 pounds, base. Less than carload lots are $1 a ton higher than foregoing prices.

Rails and Track Supplies.—A number of small inquiries from various of the western roads are being figured upon, but the total tonnage of heavy sections under consideration at present is small. It is learned that the delivery of the Burlington rails is to begin in February and continue at the rate of 5,000 tons a month. It has not been finally decided whether the first of the rails will be rolled at Gary, as it had not been expected to start up the rail mill much before April 1. The light rail sales continue in good volume, but prices are far from firm. The inquiry from the Burlington road for angle bars for 60,000 tons of rails has not been acted upon any further and it is quite possible that continuous joints will be used instead. A lull has come in the contracting for spikes and bolts, but several roads including the Illinois Central, the Big Four and the Burlington have not yet covered their needs. There are no changes in prices and we quote as follows:

Standard Bessemer rails, $28; open-hearth, $30, f. o. b. mill in 500-ton lots and over; less than 500 tons, $2 extra, full freight to destination; light rails, 25-pound to 45-pond, $26; 20-pound $27; 16-pound, $28; 12-pound, $29. Track supplies, f. o. b. Joliet, angle bars, 1.50c to 1.60c; spikes, 1.80c to 1.90c; track bolts, with square nuts, 2.15c to 2.25c; with hexagon nuts, 2.30c to 2.40c. Small railroad and square boat spikes, 1.90c base, f. o. b. Chicago.

Merchant Pipe and Boiler Tubes.—There are no features of general interest in the routine trade in tubular goods. We quote mill discounts as follows:

	—Steel— Black.	Galv.
¼ to 6 inches, inclusive.....	73.2	63.2
7 to 12 inches, inclusive.....	70.2	55.2

BOILER TUBES.

	Steel.	Iron.	Seamless.
2¼ to 5 inches, inclusive..	63.2	50.2	50.2

Cast Iron Pipe.—The only pipe lettings of interest were those at St. Paul and Indianapolis. The St. Paul work, in which was 2,000 tons, went to the Dimmick Pipe Co., but Indianapolis rejected all bids. We quote as follows: 4-inch pipe, $27; 6 to 16-inch, $26; larger sizes, $25; gas pipe, $1 a ton higher.

Wire Products.—The mills of the leading interest will come to the close of the year with about 80 per cent of their capacity in operation. The general quietness is somewhat accentuated in these lines because of seasonal dullness. We quote as follows:

Wire nails, jobbers' carload lots, $1.95; retailers' carload lots, $2; painted barb wire, jobbers' carload lots, $2.10; retailers' carload lots, $2.15, with 30c for galvanizing; plain wire to jobbers in carloads, 1.80c; and to retailers in carloads, 1.85c. Wire rods,

Bessemer, $33; open-hearth, $34; chain rods, $33, f. o. b. Pittsburg.

Old Material.—There was scarcely a transaction of any kind in the scrap market last week and while the market is probably somewhat weaker, there is little actual information from which to gage the decline exactly. The necessity for moving the old material that is now coming in continually to those who have been buying the recent railroad lists is responsible for the concessions offered, particularly because of the light demand from consumers. One railroad list is offered this week covering about 3,500 tons, of which 500 tons are re-rolling rails. We have revised our prices and quote gross tons in the first paragraph as follows:

Old car wheels	$15.25 to 15.75
Old iron rails	20.00 to 20.50
Re-rolling rails (4 ft. and over)	16.75 to 17.25
Old steel rails (4 ft. and under)	15.25 to 15.75
Light section relayers, 45 lbs. and under, subject to inspection	21.00 to 23.00
Relaying rails, subject to inspection	19.00 to 19.50
Frogs, switches and guards	14.75 to 15.25
Heavy melting steel	14.75 to 15.25

We quote, net tons, as follows:

No. 1 R. R. wrought	$14.00 to 14.50
No. 2 R. R. wrought	13.00 to 13.50
Knuckles, couplers and springs	14.00 to 14.50
Shafting	16.50 to 17.00
Iron car axles	20.75 to 21.25
Steel car axles	18.50 to 19.00
Dealers' forge No. 1	11.00 to 11.50
Pipes and flues	11.00 to 11.50
No. 1 cast, 150 lbs. and less	13.75 to 14.25
No. 1 mill	9.00 to 9.50
Mixed busheling (Nos. 1 and 2)	9.25
Country sheet	5.50 to 6.00
No. 1 boiler cut	10.50 to 11.00
Boiler punchings	12.50 to 13.00
Cast borings	7.25 to 7.75
Mixed borings, etc.	7.50 to 8.00
Machine shop turnings	9.00 to 9.50
Railroad malleable	13.50 to 14.00
Agricultural malleable	11.50 to 12.00
Stove plate and light cast scrap	12.00 to 12.50
Old iron splice bars	17.00 to 17.50

CLEVELAND.

Season Figures on Ore Shipments—Pig Iron Quiet.

Office of THE IRON TRADE REVIEW, Browning Building, Dec. 22.

Iron Ore.—The final shipment of iron ore for the season was from Escanaba, and made the total for December, 78,924 tons, and for the season, 25,427,094. The shipments for the past three years were as follows:

Port.	Dec. 1906.	Dec. 1907.	Dec. 1908.
Escanaba	134,778	39,572	19,272
Marquette	47,814	4,466	19,305
Ashland	54,551	14,396	14,707
Superior	103,679	13,204	25,640
Duluth	122,043	.....	.....
Two Harbors	77,729	19,179	.....
Total	540,594	90,817	78,924

Port.	Season 1906.	Season 1907.	Season 1908.
Escanaba	5,851,050	5,761,988	3,351,502
Marquette	2,791,033	3,013,826	1,487,487
Ashland	3,388,112	3,437,672	2,513,670
Superior	6,083,057	7,440,386	3,564,030
Duluth	11,220,218	13,445,977	8,808,168
Two Harbors	8,180,125	8,188,906	5,702,237
Total	37,513,595	41,288,755	25,427,094

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, $4.50; old range non-Bessemer, $4.25; Mesabi Bessemer, $3.70; Mesabi non-Bessemer, $3.50.

Pig Iron.—The market is quiet, but there is no tendency toward weakness. At Cleveland furnaces, $16 for No. 2 is the price for shipments outside of the city, but it is understood that in one case this quotation was shaded 10 cents. Cleveland furnaces are well supplied with orders, and are making shipments promptly on contracts. The demand for malleable on contracts has shown a decided improvement. Some inquiry is being received for delivery the last half of next year, but furnaces are not eager to quote for that delivery. We quote delivered in Cleveland over the remainder of the year as follows:

No. 1 foundry	17.50 to 17.75
No. 2 foundry	17.00 to 17.25
No. 3 foundry	16.50 to 17.00
No. 2 southern	16.85 to 17.35
Gray forge	15.00 to 16.00
Bessemer	$16.90 to 17.90
Lake Superior charcoal	19.50 to 20.00
Jackson Co. 8 per cent silvery	20.05

Coke.—The market is not active but prices are firm. One coke interest which has fully sold up for the first half declined to make a contract for the second half at $2.25 for furnace coke. We quote standard furnace coke on contract for the first half $2 to $2.10, and standard foundry coke $2.35 to $2.50. Furnace coke is sold at $1.80 to $1.85 for spot delivery, and prompt foundry coke $2.20 to $2.35.

Finished Material.—There has been rather unexpected improvement and considerable contracting has been done. The leading interest will make contracts for about 25,000 tons of material, including 16,000 tons of bars and 2,500 tons of structural material. The Empire and Union rolling mills will have orders enough to keep them running up to Christmas. An inquiry is pending for 2,000 tons of axle billets. Specifications are satisfactory in nearly all lines, especially for some products that have been rather dull.

Old Material.—A slightly softening tendency continued to be noted in some kinds of material, steel rails dropping 50 cents a ton. However, no further price reductions were actually made, although little material in quantity passed from dealers to consumers. Holders of material in quantity appear to be more willing to discuss possible sales now than in weeks past. We quote f. o. b. Cleveland as follows:

Old iron rails	$19.00 to 19.50
Old steel rails (re-rolling)	16.50 to 17.00
Old steel rails (under 6 ft.)	16.50 to 17.00
Old car wheels	15.50 to 16.00
Old steel boiler plate	13.50 to 14.00
Steel axles	20.00 to 20.50
Malleable iron (railroad)	15.00 to 15.50
Malleable iron (agricultural)	13.50 to 14.00
Heavy steel	15.75 to 16.25
Country mixed steel	13.50 to 14.00
Low phosphorus	17.00 to 17.50

We quote, net tons, as follows:

No. 1 R. R. wrought	$15.50 to 16.00
No. 1 busheling	13.50 to 14.00
No. 1 machine cast	13.50 to 14.00
Iron axles	19.00 to 19.50
Axle turnings	11.00 to 11.50
Machine shop turnings	10.00 to 10.50
Grate bars	12.00 to 12.50
Pipes and flues	12.50 to 13.00
Tank iron	12.50 to 13.00
Hoop and band iron	9.25 to 9.75
Sheet iron	8.50 to 9.00
Wrought drillings	9.50 to 10.00
Stove plate	12.50 to 13.00
Cast borings	8.50 to 9.00

CINCINNATI.

Large Inquiry From Plumbing Concern—One Good-Sized Purchase.

Office of THE IRON TRADE REVIEW, First National Bank Bldg., Dec. 22.

Pig Iron.—The leading interest in plumbing supplies is in the market this week for about 4,000 tons of foundry iron for second quarter delivery for its Louisville plant. This appears to be the only inquiry of importance under consideration. It is reported that the large inquiry of the American Car & Foundry Co. resulted in a purchase of some 6,000 or 7,000 tons of No. 1 and No. 2 foundry for delivery at the Detroit plants, the order being taken by a Toledo furnace company. The prices were said to be $17.50 for No. 1 foundry and $17 for No. 2 foundry delivered Detroit. Some gray forge was purchased at $11.50 Birmingham, but the bulk of the gray forge tonnage wanted, which will be from 3,000 to 5,000 tons, has not yet been closed. The general market remains unchanged. Southern furnaces are maintaining $13 Birmingham for prompt delivery and for first half of 1909, but for second quarter, alone, are asking $13.50 Birmingham. In southern Ohio prices remain at $15.50 at furnace for prompt delivery or first half, with $16 asked for second quarter alone. Jackson county 8 per cent silvery remains firm at $18.50 at furnace. Southern charcoal iron is held at $21 Birmingham. The attitude of southern producers is unchanged and they regard the outlook for 1909 with much confidence. Consumers are fairly well covered for the first quarter and the market is expected to remain inactive for the present. The appearance of two large consumers in the market this week and last is regarded as encouraging to sellers. We quote for prompt delivery, and first quarter of 1909, delivered Cincinnati, based

on freight rates of $3.25 from Birmingham and $1.10 from Ironton, as follows:

Southern foundry No. 1	$16.75 to 17.25
Southern foundry No. 2	16.25 to 16.75
Southern foundry No. 3	15.75 to 16.25
Southern foundry No. 4	15.25 to 15.75
Southern No. 1 soft	16.75 to 17.25
Southern No. 2 soft	16.25 to 16.75
Southern gray forge	14.75 to 15.25
Northern No. 1 foundry	17.10 to 17.60
Northern No. 2 foundry	16.60 to 17.10
Northern No. 3 foundry	16.10 to 16.60
Northern, 8 per cent silicon	19.60

Finished Material.—Jobbers report business very quiet this week and there appears to be less call for miscellaneous small lots out of stock than during November. Prices, however, remain unchanged and small orders are filled here at the following quotations:

Iron and steel bars, 1.85c to 2c, full extras. Angles, 3 x 3 and over, 2.10c to 2.25c; beams and channels, 15 inches and under, 2.10c to 2.25c; small angles and architectural channels, 2c base; plates, ¼-inch and heavier, 2c; 3-16-inch, 2.10c; No. 8, 2.15c; sheets, blue annealed, No. 10, 2.15c to 2.25c; No. 12, 2.20c to 2.30c; No. 14, 2.25c to 2.35c; No. 16, 2.35c to 2.45c; box annealed sheets, Nos. 18 and 20, 2.55c to 2.65c; Nos. 22 and 24, 2.65c to 2.75c; Nos. 25 and 26, 2.70c to 2.80c; No. 27, 2.75c to 2.85c, and No. 28, 2.85c to 2.95c; boiler tubes, 2¾ to 5 inches, 62 per cent off base; turn-buckles, 45 per cent off; rivets, 3c base; cold and rolled shafting, 47 to 50 per cent off list; steel tire, 2.05c to 2.10c base.

Coke.—The market remains unchanged, but the production promises to be smaller for the next two weeks owing to the annual exodus of coal miners and the general stoppage of mining operations during the holidays. Consumers of foundry coke appear to show little interest in their next year's requirements, but furnaces are fairly well covered, and the ovens have a satisfactory number of orders for coke booked for furnace use. Foundry coke for prompt delivery can be had at from 25 cents to 30 cents per ton below the prices ovens are asking on contracts, and this has a tendency to keep the foundry buying from hand to mouth. Contract prices in the leading coke producing districts are as follows:

	PER TON.
Wise county furnace coke	$1.90
Wise county foundry coke	2.25 to 2.35
Pocahontas furnace coke	1.85 to 2.00
Pocahontas foundry coke	2.00 to 2.25
Standard Connellsville furnace coke	2.00 to 2.25
Standard Connellsville foundry coke	2.35 to 2.50

Old Material.—Dealers continue to maintain prices and quotations remain unchanged, although the outside figures may be regarded as more nearly representing dealers' asking prices to melters. We quote as follows F. O. B. Cincinnati:

Old No. 1 R. R. wrought, net tons	$14.50 to 15.00
No. 1 machinery, net tons	13.50 to 14.00
Old iron rails, gross tons	18.00 to 18.50
Old steel rails (re-rolling) gross tons	16.50 to 17.00
Old short lengths, gross tons	16.50 to 17.00
Old iron axles, net tons	17.00 to 18.00
Heavy melting scrap, gross tons	14.50 to 15.50
Stove plate, net tons	11.00 to 11.50
Wrought turnings	8.00 to 8.50
Cast borings, net tons	6.00 to 7.00
Car wheels, gross tons	15.50 to 16.00

PHILADELPHIA.

Strong Situation of Blast Furnaces—Stocks Steadily Declining.

Office of THE IRON TRADE REVIEW,
408 Central Trust Bldg., Dec. 22.

Pig Iron.—The strength of the situation can be judged from the fact that orders on the books of interests affiliated with the Eastern Pig Iron Association, representing 48 stacks, showed a remarkably heavy increase during the month preceding last week's meeting, while stocks suffered a further decline, despite the blowing in of several furnaces, and are now equivalent to only two or three days' output. Certain large interests are already puzzled to know how the earlier part of their heavy bookings can be filled. Melters are specifying freely and requests for anticipations are frequent, while the approach of inventory time is bringing out less than the usual number of calls for delayed shipments. One of the Brooks furnaces is ready to blow in, another of the Lackawanna stacks at Lebanon is shortly to be fired and the small Macungie furnace is also about ready to begin. Except where further capacity is needed to fill actual orders on books, it is not expected that many additional stacks will go into blast, as the current price level is not sufficiently attractive. Prices, however, are ruling very firm, and some advances may be expected from interests which have accumulated all the orders they now desire. Basic and pipe irons have been the chief contributors to the week's activities, which otherwise have not been important. Both appear somewhat scarce, forge iron partly because of the high level of scrap and partly because pipe interests have bought quite heavily. One large melter in New Jersey took on about 10,000 tons during the week, and some smaller sales were also closed. On basic, producers are now holding for $17, delivered. The 15,000-ton sale, reported last week, went at $16.65. During the current week a good tonnage was placed by a New Jersey producer with an eastern steel plant. Sales of 1,000 tons and 500 tons of low phosphorus irons are also noted, the price being in the neighborhood of $21.50, delivered, this being the price at which a 5,000-ton block for western delivery was recently placed. We quote, first quarter delivery, eastern Pennsylvania plants, as follows:

No. 1X foundry	$17.50 to 18.00
No. 2X foundry	17.00 to 17.50
No. 2 plain	16.50 to 17.00
Standard gray forge	16.00 to 16.50
Basic	16.75 to 17.25
Low phosphorus	21.00 to 21.50
No. 2 Birmingham	17.75 to 18.25
No. 2X Virginia	17.50 to 18.00
No. 2 plain Virginia	17.00 to 17.50

Finished Materials.—The aftermath of the Pennsylvania rail purchase is in some particulars more interesting than the announcement of the purchase itself. It can be stated with authority that nothing has yet been decided as to the relative amounts of Bessemer and open-hearth rails. The contract calls for a certain tonnage of rails and details prices at which the various grades are to be furnished, but no specifications as to the amounts of the various grades required have been made. The discard proposition, it is also stated with authority, is left to the manufacturers, no absolute percentage of crop being fixed. No further buying is reported, though the B. & O. is figuring its probable requirements and is expected to place 50,000 or 60,000 tons at an early date. In other finished lines, trade is experiencing a seasonable lull. Cramps will build a steam steel collier, for which a good tonnage of plates will be needed. We quote: Structurals, 1.75c to 1.90c; plates, 1.75c to 1.80c; refined bar iron, 1.50c to 1.55c; steel bars, 1.55c.

Old Materials.—Prices continue as a week ago, but the situation has lost much of its excited tone and has apparently taken on a healthier aspect. No important sales are noted, but the price level is firm throughout the list, possibly excepting railroad wrought. Steel mills are generally refusing to pay more than $17 for heavy steel, and as a result practically no sales are being made. Shipments are going in steadily on the recent heavy purchases by Worth Bros., and the scrap is being rigidly inspected, a considerable tonnage being daily rejected. We quote, gross tons, eastern Pennsylvania delivery, as follows:

Old steel rails (re-rolling)	$18.00 to 18.50
No. 1 steel scrap	17.25 to 17.75
Old steel axles	22.00 to 23.00

Old iron axles	25.00 to 26.00
Old iron rails	21.00 to 22.00
Old car wheels	16.00 to 16.50
Choice scrap R. R. No. 1 wrought	20.00 to 20.50
No. 1 yard scrap	17.50 to 18.00
Machinery scrap	16.00 to 16.50
Low phosphorus scrap	18.50 to 19.00
Wrought iron pipe	15.25 to 15.75
No. 1 forge fire scrap	15.00 to 15.50
No. 2 forge fire scrap, ordinary	10.00 to 10.50
Wrought turnings	13.25 to 14.25
Axle turnings, heavy	14.25 to 14.75
Cast borings	13.00 to 13.50
Stove plates	13.50 to 14.00

ST. LOUIS.

Little Activity in Pig Iron, but Prices Are Firm.

Dec. 21.

Pig Iron.—Melters in the St. Louis territory still manifest a disposition to delay the placing of orders for pig iron until after the holidays and stock-taking, which follows the close of the year. The result is that business was rather dull last week, with no large orders or inquiries reported. Some orders and inquiries are out for shipment over the first quarter and first half of next year, but they are not large. Prices are firm at $13 to $13.50, Birmingham, for No. 2. Our quotations, delivered, to which the freight of $3.75 from Birmingham has been added, follow:

No. 1 southern	$17.25 to 17.75
No. 2 southern	16.75 to 17.25
No. 3 southern	16.25 to 16.75
No. 4 southern	15.75 to 16.25

Coke.—There is a fair demand for coke, and spot shipments may be had at a shade less than the schedule. Connellsville, best-selected 72-hour foundry coke is quoted at $2.25 to $2.75. Connellsville 48-hour furnace coke is still firm at $2 to $2.25, ovens, and Virginia and West Virginia at $2.50, ovens. The freight rate from Connellsville and the Virginia fields to East St. Louis and St. Louis is $2.80, and $2.70 from the Virginia fields when shipment is destined beyond St. Louis.

Old Material.—Our quotations on scrap iron remain as follows, with fair demand:

Cast iron borings, free from foreign material, net tons	$ 6.00
Steel axle turnings, gross tons	12.25
Steel railroad axles, net ton	17.50 to 18.50
Iron railroad axles, net ton	19.00 to 20.00
Miscellaneous steel scrap, gross ton	12.25
Old car wheels, gross ton	16.00
No. 1 railroad cast scrap, net ton	12.00 to 12.50
Heavy machinery cast, net ton	13.00
Stove plate and light cast, net ton	11.50
Sheet iron, net tons, uncut	5.00
No. 1 railroad wrought, net ton	12.00 to 13.00
Railroad malleable, net ton	11.50
Heavy melting steel, net ton	11.50 to 12.00
Relaying rails, net ton	14.00 to 15.00

BUFFALO.

Pig Iron Prices Advancing, but Sales Are Not Numerous.

Office of THE IRON TRADE REVIEW,
932 Ellicott Square, Dec. 22.

Pig Iron.—The market has a stronger tone and there is a tendency toward more definite prices. Quotations in several respects are slightly advanced, as indicated in the schedule given below. These modifications have been gradual and show in a substantial way a stronger condition of the market. Charcoal is selling here in small lots at $20 50 to $21, an advance of 25 cents, and malleable Bessemer, $17 to $17.50. The same grade had sold for more than a month at $16.50 to $17. Gray forge is now quoted at $15.50, which is an advance of 50 cents. No. 3 is quoted at $15.75 to $16.25. No. 1X, No. 2X and No. 2 plain are quoted slightly stronger. No. 2X foundry is selling at $16.25 to $16.75. Actual business is light and is likely to be so until after the beginning of first quarter. Southern furnaces are offering tonnage in this district, for first quarter delivery, prices based on $13 Birmingham for No. 2 foundry. The freight rate on pig iron from Birmingham to Buffalo is $4.90. For first quarter delivery, we quote, f. o. b. Buffalo, as follows:

No. 1 X foundry	$16.75 to $17.25
No. 2 X foundry	16.25 to 16.75
No. 2, plain	15.75 to 16.25
No. 3 X	15.50 to 15.75
Malleable Bessemer	17.00 to 17.50
Gray forge	15.25 to 15.50
Charcoal	20.50 to 21.00

Finished Products.—Business continues quiet except so far as specifications are concerned. As the year draws to a close, the number of specifications and inquiries increase. In fact, so far as this phase of the business is concerned, the amount of heavy specifications having reached local offices is considerably more than was expected some weeks ago, and while no contracts of interest were placed the past week, the outlook now for substantial tonnage early in 1909 is excellent. A good deal of activity is shown in inquiries for bar iron.

BIRMINGHAM, ALA.

Some Sales Being Made in Spite of Holiday Dullness.

Dec. 22.

The pig iron producers in Alabama are still selling some iron, notwithstanding the holiday season has set in, and it is usually the case that there is practically a total cessation of business. It is also stated that some small sales of iron have been made again at a rate above $13 per ton, No. 2 foundry. The regular quotation, however, for the product is $13 per ton, No. 2 foundry, with some orders having been booked for delivery during the second quarter of the coming year. The larger companies are not anxious to make many sales for delivery during the first quarter of the coming year. The make is unchanged since the last report. Positive announcement is made that immediately after the turn of the year there will be several furnaces put in blast and the output of this territory materially increased.

Inquiries have been received in this district for iron for the first half of the coming year from some of the larger consumers, the cast iron pipe concerns, and the inquiries will likely result in business. The local cast iron pipe concerns are well supplied with orders and have in hand or under contract a large quantity of iron, covering the probable needs for some time to come, at least.

George G. Crawford, president of the Tennessee Coal, Iron & Railroad Co., who is in St. Vincent's hospital with typhoid fever, is improving slowly.

NEW YORK.

Interesting Statistics in Structural Business of the Past Year.

Office of THE IRON TRADE REVIEW,
Room 1005, No. 90 West St., Dec. 22.

Iron Ore.—Some small buying of foreign ores has been reported during the past week, but the tonnage involved was small in comparison to that recently noted, being limited to a few cargoes. Local miners are well taken care of so far as present orders are concerned, and with the prospect of an improved demand later in the winter are not anxious to enter into contracts for advanced delivery.

Pig Iron.—Activities during the past week have been chiefly confined to sales of basic and forge irons for eastern Pennsylvania delivery, with which exception the market has been quiet. Small sales of foundry iron are not infrequent, but do not aggregate an important tonnage, although one lot of 3,000 tons was placed for prompt shipment. A New Jersey furnace interest late in the week placed a lot of 20,000 tons of basic with an eastern Pennsylvania steel plant for first quarter shipment, and probably 15,000 tons were placed with other melters. On the sale of 15,000 tons mentioned a week ago, the price was $16.65, delivered, equivalent to $16, furnace, but producers are now holding firmly at $17, delivered, and, in view of the scarcity of this iron, little difficulty will probably be experienced in securing this price. One of the Swede furnaces met with an accident a few days ago, but will not be forced out

of blast, as was feared at first; it operates on basic. Small sales of low phosphorus iron have been made during the week, notably of 500 and 1,000 tons for eastern Pennsylvania delivery, on the basis of $21.50 for this shipment; this was the basis on which the Corporation took 5,000, as reported a week ago. Foundry is firm at prevailing prices, but one important interest has announced an advance of 25 cents and is so well supplied with orders that it is not eager for further first quarter business. Topton furnace will be ready for the torch early in January. The southern product is selling on the basis of $13 to $13.25, Birmingham, and Virginia iron at about $14.50. We quote, New York tidewater delivery, during the first quarter, as follows:

Northern foundry No. 1	$17.75 to 18.25
No. 2X foundry	17.25 to 17.75
No. 2 plain	16.50 to 17.00
No. 2 southern foundry	17.25 to 17.75
Malleable	18.00 to 18.50
Basic	17.00 to 17.25
Gray forge	16.25 to 16.75

Ferro-Alloys.—The week has witnessed the circulation of several carload inquiries for ferro-manganese and ferro-silicon, but no important sales have developed. As a result of the heavy buying reported earlier in the month, the situation is strong and prices are being well maintained, ferro-manganese at $45.50 to $46, seaboard, and ferro-silicon at about $65, Pittsburg.

Finished Materials.—With the prospect that little additional business will be closed during the holidays, some interesting figures on the structural market of the year just ending are now available. Total bookings of the American Bridge Co. have been in the neighborhood of 250,000 tons. It carried over into the current year close to 400,000 tons, which made possible the operation of its plants at an average of 50 per cent through the year. Delivered product aggregated about 350,000 tons and some 200,000 tons are being carried over into the new year, this figure being somewhat reduced because of under-specification on tonnage contracts. The volume of business handled by the American Bridge Co. during the year was considerably smaller than usual in comparison to the total business in the trade. It is estimated that independent interests during the year turned out about 800,000 tons of structural materials, principally on orders booked during the year, as their tonnage carried into the year was not important.

Several apartment buildings in this city are figuring in the current structural trade. Two apartments for the Carlyle Realty Co. on Cathedral Parkway, involving 1,100 tons, have been taken by the Alfred E. Norton Co., and Bethlehem shapes will be employed. Over 500 tons will be required for the Gracehull Realty Co. apartment on 110th street, on which figures are now being taken. The Smead Architectural Iron Works, Louisville, secured the Hermitage hotel at Nashville, 1,000 tons; the Ives Memorial library at New Haven, 500 tons, and a loft building for the Diamond Tire Co., in this city, went to the Hay Foundry & Iron Works; the White building in Seattle, 1,000 tons, went to Milliken Bros.; Levering & Garrigues took a 600-ton extension to the Hartford building on Seventeenth street and 450 tons for the State library at Hartford, and the Morava Construction Co. secured the steel work, 1,200 tons, for the Cosmopolitan Electric Co. at Chicago. A 500-ton power house for Bellevue hospital went to an independent interest. The American Bridge Co. secured the Chicago city hall, 11,000 tons, from the Noelke Construction Co., 600 tons for the Columbia theater, and 300 tons for the Spreckel's building in San Francisco, and about 700 tons of bridge work on the Lake Shore at Chicago. Milliken Bros. have received orders on an old contract for 1,000 additional galvanized steel transmission poles for southern shipment, this representing about 1,500 tons of steel. Figures are being prepared on a 600-ton insane hospital at Fairview, Pa.; on a pier shed and office for the Long Island railway at pier 32, East river, and on the Bing & Bing apartments, 1,100 tons, in this city. Wells Bros. are taking figures on the 1,600 tons of steel needed for the Stearn's building in Boston, a large warehouse for the Washburn-Crosby Co. at Buffalo is pending; bids have been extended to Dec. 28 on the Wick building in Youngstown, 1,000 tons; the Curtis job in Philadelphia is expected early in the year and the Boston and Albany steel elevators about February. The city is expected to advertise soon after the beginning of the year for the last of the North river piers, No. 53, requiring about 1,800 tons.

Railway work is not extensive. The Lackawanna has placed orders with the American Car & Foundry Co. for 500 box cars and 300 steel hoppers. A good demand continues for frog and switch work. Cast iron pipe is quiet. Deliveries are now being made by the United States Cast Iron Pipe & Foundry Co. on a lot of 14,000 tons sold some months ago for shipment to Cuba. We quote:

Angles, 3 to 6 inches x ¼-inch and heavier, 1.76c; beams, 3 to 15 inches, 1.76c; tees, 3 x ¼-inch and heavier, 1.81c; plates, carloads, tanks, 1.76c; marine boilers, 2.16c; bar iron, 1.46c to 1.56c; soft steel bars, 1.56c; sheets, No. 28, black, 2.66c.

Old Materials.—Some 2,000 or 3,000 tons of heavy melting steel have been sold during the week for shipment eastward and one large accumulation, sold three months ago, has just been moved to Pennsylvanvia. A weaker tone prevails in stove plate, as the leading consumer has 15,000 tons, or six months' supply on hand. Moderate selling is noted in other lines and we quote, gross tons New York delivery, as follows:

Old steel rails (re-rolling)	$15.50 to 16.00
Relaying rails	21.50 to 22.00
Old car wheels	14.00 to 14.50
Old iron car axles	19.50 to 20.00
Old steel car axles	19.00 to 20.00
Heavy melting steel	14.50 to 15.00
No. 1 railroad wrought	17.00 to 17.50
Iron track scrap	14.50 to 15.00
Wrought pipe	12.50 to 13.00
Cast borings	10.00 to 10.50
Wrought turningss	11.00 to 11.50
Heavy cast scrap	14.00 to 14.50
Railroad malleable	13.00 to 13.50
Stove plate	10.00 to 10.50
Grate bars	11.00 to 11.50

BRITISH IRON MARKET.

Some Improvement in Pig Iron—More Railroad Activity.

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., Dec. 12.

The effect of the recovery in America has been felt this week in increased buying of pig iron. The market is remarkably steady, prices being substantially the same as they were a week ago. It is significant that the price maintenance has been in spite of increased stocks amounting already this months to 4,919 tons, and reduced shipments, which so far have been 28,267 tons, compared with 40,612 tons last month. Both the continent and Scotland are at present rather poor buyers. A hopeful sign is that forward booking tends to increase in price; thus figures for three months are 49s½d ($12.1), against 48s7½d ($11.91) for prompt transactions. The amount in store is now 110,584 tons. The hematite market is not quite so strong, mainly because the steel trade still leaves a good deal to be desired; at the same time, producers insist upon 56s ($13.70) for mixed numbers. In the Midlands there is a great amount of pig iron business being done for the new year, substantially at recent prices, although firms exceptionally favored are getting from 6d to 1s advance. Buying is practically universal among consumers who are convinced that better times are coming with the New Year. The Carnforth Hematite Iron Co. and the Millom & Askam Hematite Co. are both blowing out furnaces, as the result of slack demand, and the slight

increase in stocks. This will reduce the output by 1,700 tons per week.

Finished Material.—Although the tone has slightly improved, the finished iron trade fails to reflect the greater activity of the pig iron market. The best contract in South Staffordshire of the past few days has been an order placed by a railway for 1,500 tons of best marked bars. The railways are waking up a little, the Midland Co., for example, having just placed a big rail order, the execution of which will take three years. There is a little more life in the lighter steel trades, and rather more business coming along for railway rolling stocks. The Metropolitan Amalgamated Co. is decidedly more active of late. The nut and bolt companies are also doing rather better. More business is reported in crude steel for sheet making, wire rolling and similar purposes. Consumers are making up their minds in the absence of foreign dumping, that their supplies must come from British sources. The galvanized sheet trade is slightly better, and in tinplates some of the mills have several months' work ahead, and all are busy, with a few putting down new plant. Slightly more activity is recorded in the structural engineering department, the dullness of which for months past has been phenomenal. A Sheffield firm has within the last few days booked an order for 1,200 steel tires for rolling stock on the Assam and Bengal railway.

The Barrow Steel Works are to be re-started in January, although the reported rail orders, so far, have gone to Workington, Sheffield and elsewhere.

GERMAN IRON MARKET.

Improvement in Pig Iron, But Finished Lines Very Dull.

Dusseldorf, Dec. 9.—The situation on our iron and steel market is so complicated that it is rather difficult to present a clear description of it. Pig iron is better and prices have advanced during the last fortnight after great quantities have been contracted at the bottom prices for delivery over the first half of 1909. Some makers have sold out their entire output, till July 1, whilst others have sold only till April 1. Today the price quoted for best Westfalian hematite is about 60 marks ($14.25) for producers' works, whilst the lowest price at which contracts were made about 10 days ago was 51 marks ($12.20) per 1,000 kilos. Luxembourg foundry No. 3 has risen from 42 marks ($10) to about 46.50 marks ($11), but buyers decline to close at these improved prices. Very many buyers of pig iron have contracted for far more than they can use themselves and thus it is feared that the contracts made so far have been made for speculation. Blast furnace coke has now been reduced by 2 marks ($0.50) per 1,000 kilograms, and is today 16 marks f. o. b. mines ($3.80). The coal prices for 1909 are about the same as for 1908. In half finished material the situation is worse than before and the report of the Stahlwerksverband for November will be the worst it has ever issued. Bar iron, plates and sheets are also worse as regards prices and also the quantity of orders. The political troubles on the Balkan and also in the inland influence the demand very badly and generally buyers keep back, the more, as also the last American reports show that the improvement over there is pausing. As regards the outlook of the future, it is generally believed that we are now at the bottom and that we will remain on it during the first half of 1909. Money is weaker and more offered; the official bank rate is still 4%, but money for building purposes cannot be had yet at less than 4½-5% with a commission of about 2% for the broker.

METAL MARKET

CHICAGO

Dec. 22.

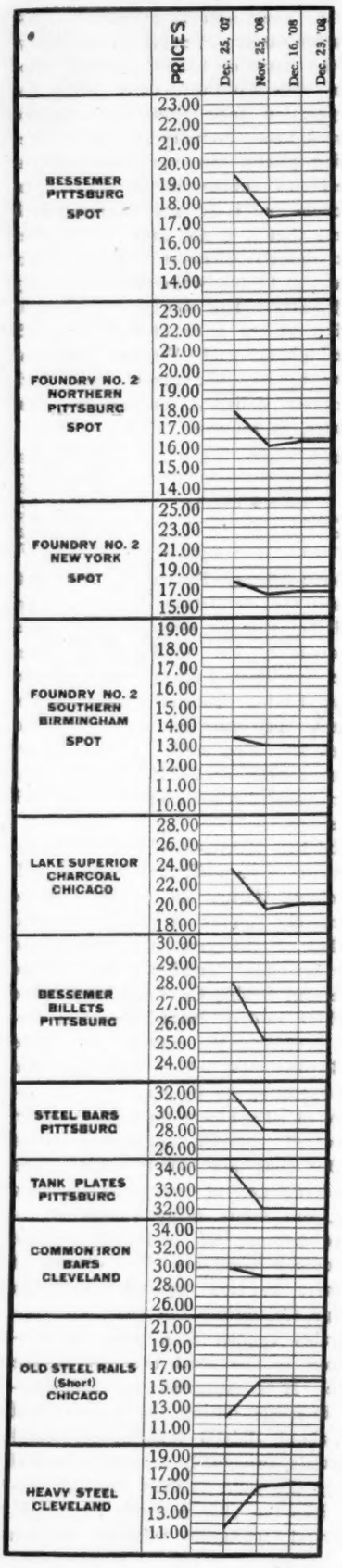
The metal market is quiet. Buying for immediate consumption is fairly satisfactory and futures in copper are good. Lead and tin are not so strong. We have revised our prices and quote as follows:

Lake copper, carload lots, 14¾c to 15c; casting, carload lots, 14½c; pig tin, 31½c to 31¾c; spelter, 5c to 5.25c; pig lead, desilverized, 4.40c to 4.45c in 50-ton lots; corroding, 4.85c to 4.95c in 50-ton lots; car lots, 2½c per 100 pounds higher; sheet zinc, 7c list, f. o. b. LaSalle in car lots of 600-pound flasks; Cookson's antimony, 10½c to 11c; other grades, 10c.

The scrap metal market is very quiet and with the exception of some weakness in lead there are no changes in price. We quote to dealers as follows:

Copper wire, 12¾c; heavy copper, 12¾c; light copper, 11½c; heavy red brass, 11¾c; heavy yellow brass, 8¾c; light brass, 6¾c; No. 1 red brass borings, 9¼c; No. 1 yellow brass borings, 9¼c; brass clippings, 8¾c; tea lead, 3¼c; lead scrap, 3¾c; zinc, 3.25c; tin

PRICE CHART.



plate, 24c; tin foil, 23c; pewter, 16c; electrotype plates, free from wood, 4c; electrotype dross, 2¾c; stereotype plates, 4¼c; stereotype dross, 3c; prime slab zinc dross, $55 per ton.

ST. LOUIS.

Dec. 21.

Lead and Zinc.—There was a slump in the price of zinc ore in the Missouri-Kansas fields last week, owing to heavy purchases, the prevailing price being from $40 to $42 a ton for 60 per cent zinc. A base price of $43 was offered early in the week, but it soon dropped out of sight. As high as $46 a ton was paid for high-grade mineral. The f. o. b. base price went to $46 a ton in the Miami, Okla., district. The mineral is beginning to accumulate again, notwithstanding many of the bins were cleaned out, as many of the operators are holding out for another rise in prices. There is some surplus ore in the district because some operators refuse to dispose of their holdings when offered $44 base.

Lead ore was weak in demand, and prices declined, ranging from $48 to $51 a ton. The base for silicate was $19, with $24.50 as a high price.

NEW YORK.

Dec. 22.

Copper.—There is little eagerness to sell on the part of the leading Lake producers, but other grades are not so firm and certain weaker interests are offering freely at the current quotations: Lake, 14¼c to 14⅜c; electrolytic, 14c to 14⅛c; casting, 13⅞c to 14c.

Pig Tin.—In the face of a dull market prices have barely held their own, consumers seemingly being concerned only with their immediate requirements. Spot metal can be had at about 29c.

Pig Lead.—Pressure to dispose of heavy accumulations in the west, taking in connection with the meager interest of melters, has shaded off prices to 4.17½c to 4.22½c, New York.

Spelter.—No change in prices is noted and the situation continues much the same as a week ago. We quote: 5.12½c to 5.15c, New York.

Antimony.—Cookson's, 8.15c to 8.25c; Hallett's, 8c to 8.10c; ordinary brands, 7.75c to 8c.

Hickman, Williams & Co. have secured the agency for the sale of the pig iron of the Alabama Consolidated furnace company, taking effect Feb. 1, 1909, and the agency of the Woodstock furnace, effective Feb. 18, 1909.

FIRST FURNACE BLOWN IN AT GARY.

On Monday, Dec. 21, in the presence of some 150 department heads of the Indiana Steel Co., Miss Mary Louise Gleason, daughter of General Superintendent Gleason, applied the torch to No. 12 furnace at the Gary plant. This is the stack upon which work was first started about 30 months ago, at which time the foundations were put down practically on the shore line of the lake. The other furnaces in the first group of four, Nos. 9, 10 and 11, are about ready to be blown in. Open-hearth No. 4 is completed, the rail mill soaking pits can be made ready at any time and most of the mills and tables of the rail mill have been turned over. It will be possible, therefore, to begin rolling the Burlington rails in February, if desired.

Westinghouse Machine Election.—The stockholders of the Westinghouse Machine Co. at the annual election chose the following officers: President, George Westinghouse; vice president, H. H. Westinghouse; general manager, Herbert T. Herr; treasurer and assistant secretary, T. L. Brown; assistant treasurer, C. V. Holmes; secretary and auditor, T. S. Grubbs; assistant auditor, J. G. McCall; executive committee, J. D. Callery, H. C. Bughman, William McConway and H. H. Westinghouse. H. H. Westinghouse, brother of the president, succeeds E. E. Keller as vice president, and it is understood will give active attention to the management of the company's affairs. At an adjourned meeting of the stockholders' committee H. C. Bughman, J. D. Callery, J. W. Frank and H. S. A. Stewart were elected directors, all being new. The other directors were re-elected from the old board, as follows: George Westinghouse, H. H. Westinghouse, William McConway, Horace E. Smith, and John F. Wallace. Those who retired from the board are W. H. Donner, who was one of the recceivers, J. C. Chaplin, Wilson A. Shaw and Robert Wardrop.

Building Gary Bar Mill.—At the Pencoyd works of the American Bridge Co., where a complete machine shop is maintained, the machinery for a large bar mill at Gary, Ind., is now being built. The Pencoyd works have constructed most of their own equipment for some time, one very large line of their own manufacture being electric motors. None of this equipment, however, is built for the general market.

A New Correspondence School.—A correspondence school for the purpose of instruction in modern cost systems, factory and commercial office systems, shop methods and system, shop contruction, equipment, organization and management, foundry systems, mechanical drawing and engineering systems, has been organized and incorporated under the title of "The Modern Systems Correspondence School Co." The president is Oscar E. Perrigo, a frequent contributor to the columns of THE IRON TRADE REVIEW, and the secretary and treasurer is Norman W. Henley, of the Norman W. Henley Publishing Co., New York. The offices of the new school are at 6 Beacon street, Boston, and are under the direct management of Mr. Perrigo.

STOVE MAKERS CONFER WITH MOLDERS.

On Dec. 15, 16 and 17, a meeting was held at the Auditorium hotel in Chicago by representatives of the Stove Founders' National Defense Association and the Iron Molders' Union of North America. The subject under discussion was the agreement for the year 1909. It was agreed that the wage rate remain the same as last year. An agreement was also reached on the molding machine question, which will be submitted to the members of the S. F. N. D. A. for ratification. It is said that this agreement will probably establish a basis for adjustment of the molding machine question as applied to the stove industry, not only for the present but for the future, as the development of the machine was anticipated under this agreement.

The new agreement will terminate Jan. 1, 1910. Previous agreements have terminated on April 1, but it was deemed advisable to change the date, so that the manufacturer of stoves could put men on the road after the first of the year with the knowledge that the wage rate question was determined and would not have to be considered in the spring as formerly.

Fabricators Organize.—At a recent meeting held in Pittsburg by a number of representative fabricating interests the National Association of Structural Steel Fabricators was organized to promote the best interests of the fabricating trade. In the election of officers, Horace E. Horton, president of the Chicago Bridge & Iron Works, Chicago, was chosen chairman and B. L. Worden, Milwaukee, was chosen secretary.

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ANDREW CARNEGIE, RETIRED.

After having become one of the wealthiest men in the world on account of profits made out of the steel business, particularly in connection with the formation of the United States Steel Corporation, and after having been a protectionist all his life, the sudden attack made by Andrew Carnegie on the protective tariff came as a distinct surprise to the country. It is true that Mr. Carnegie has not been noted for keeping himself long in the background, but one would hardly have thought that he would seek the limelight of publicity and advocate free trade without having good, solid reasons to support his position.

After having declined an invitation to appear before the ways and means committee of the House of Representatives, Mr. Carnegie appeared Monday in response to a subpoena, and instead of giving earnest, thoughtful testimony backed by carefully prepared estimates of cost, as was done by Mr. Schwab, Judge Gary and other steel manufacturers, Mr. Carnegie treated the whole subject as little more than a joke. The Associated Press, which is extremely careful in its reports, states that Mr. Carnegie's testimony "was most unique and interesting, and he frequently caused peals of laughter in the crowded room, the joke often being at the expense of the chairman or some other member of the committee." He declared emphatically against combinations or trusts, and said "that he had nothing to do with the sale of the Carnegie Steel Co. to the United States Steel Corporation, that sale having been engineered by his young partners." The report further states that Mr. Carnegie seemed to devote his efforts largely to making Chairman Payne and Representatives Dalzell and Fordney uncomfortable, calling Mr. Dalzell "John," and giving evasive replies to questions, or dealing with him in such a manner as to turn an evidently serious discussion into a humorous one.

We do not believe that the people of the United States, including the hundreds of thousands of employes who have prospered under the protective tariff, will consider the treatment of the tariff question by Mr. Carnegie as fitting for any man and much less for a former steel manufacturer. If Mr. Carnegie had any facts controverting other statements which had been made under oath, it was his privilege to present them, but the preparation of a great tariff bill is far from being a joke, and the array of facts presented by Mr. Schwab, Mr. Gary and others cannot be overthrown by cheap ridicule.

Mr. Carnegie sarcastically referred to Judge Gary's solicitude for his competitors, who may not be able to manufacture as cheaply as the Steel Corporation, as "sublime." The trouble with Mr. Carnegie is that, when he was in business, there was not such a word as "consideration" or "compassion," or "conciliation" in his lexicon. His motto was—get orders, regardless of consequences and regardless of prices. When a period of depression came upon the country, Mr. Carnegie directed his salesmen to begin the slashing of prices, and this policy was carried on with the most ruinous consequences to his competitors. It did not concern him if the business thoroughfare was strewn with the wrecks of smaller companies; he wanted business and he got it. Sometimes he also got his competitors' plants. When, something over a year ago, the policy of conciliation and co-operation was proposed by Judge Gary, it was not approved by Mr. Carnegie, who preferred to see the merciless system of other days prevail. His advice was not heeded then, and it will not be now. He is a back number in business, and having retired to private life, the present leaders in steel manufacturing will go on without his advice, lending their assistance in forming a tariff bill and in conducting business in accordance with a more enlightened policy than he is capable of appreciating.

MACHINERY IN THE STEEL WORKS.

The putting to work, two hours after steam was turned on, of a 20,000-horsepower twin tandem compound reversing engine, in the hardest engine work of a steel plant, that of driving a reversing blooming mill, and the performance of that engine thereafter, not calling for a stoppage of five minutes during more than a month's performance, with a copper cent set on edge on the bed plate, is a triumph of design and execution in engine construction which was not dreamed of a decade ago. It is, however, merely an instance of the rapid progress the steel industry is making in the employment of more and more efficient means in the execution of its work. It is not 10 years ago that the predecessor of this engine, a twin engine 55 x 60 inches, working simple, was installed. Only six years ago, an engine of this last named size and type was installed to drive a similar blooming mill in the west, and was regarded as well fitted to the work, not simply for the time, but for many years in the future.

The compound engine which has just shown its working so successfully was installed Nov. 12 last in the

Duquesne Steel Works of the Carnegie Steel Co. and was built by Mackintosh, Hemphill & Co. A companion engine for the new Aliquippa plant of the Jones & Laughlin Steel Co., was brought through the works at the same time.

The building of such engines has been brought to perfection, or they would not be employed in steel works. The achievement is recent; there has long been a demand for such engines, from their steam econ omy and from the increased capacity they give the plant. Throughout the steel industry, this employment of more and more efficient mechanical means is going on apace, as mechanical skill furnishes them. They make for economy in production, although the results in dollars and cents are not always apparent by the mere comparison of costs in different years, so many other elements entering into the case. Some of these elements, as the increased cost of coal and of labor, act in the direction of favoring the adoption of the improved mechanical appliances.

Another influence which leads to the rapid adoption of new appliances, by which the mechanical operations in the mill are being changed from year to year almost as rapidly as they were at any time in the past, is the continued desire for increased tonnage in individual plants.

This desire for increased tonnage has led to a somewhat one-sided development. There has been a greater development in the mechanical side than there has been in the metallurgical side. To employ new and improved mechanical devices means increased tonnage, while to try new metallurgical processes often means reduced tonnage, and thus metallurgical development, in the direction of modifying the composition of steel, has not proceeded apace.

It is well known to engineers, for instance, that the employment of nickel steel in tension members of large structures has much to commend it, but there is less inclination to change metallurgical processes and carry through the works special steels of this description than there is to increase tonnage by mechanical means, despite the advantage which might in the long run accrue. Again, the alloying of steel with aluminum promises a great reduction, if not an elimination, of corrosion, but there is less tendency to modify the metallurgical processes, and produce such steels for practical tests, than there is to make modifications which increase tonnage or reduce the expense of production measured in tons of coal or in human effort expended.

To problems like these mentioned the steel trade has occasion to direct more of its attention, when it has made such brilliant progress along mechanical lines.

By-Product Interest Sold. — The American Coal Products Co. announces that it has sold its by-product coke oven interests heretofore conducted by its subsidiary, the United Coke & Gas Co., to the Oberschlesische Kokswerke & Chemische Fabriken Aktien Geselschaft, of Berlin, Germany, the transfer to take effect Jan. 1. A new company is to be formed to be called the German American Coke & Gas Co., with headquarters at 17 Battery place, New York. The capital will be $2,000,000. The Oberschlesische Kokswerke & Chemische Fabriken is one of the largest by-product coke oven companies in Germany. The American Coal Products Co. will henceforth give its entire attention to the manufacture and disposal of tar products and ammonia, and will have a stock interest in the German American company.

Meeting of the A. S. M. E.—The next monthly meeting of the American Society of Mechanical Engineers will be held in the Engineering Societies building on Tuesday evening, Jan. 12. The paper will be by Carl G. Barth, of Philadelphia, upon "The Transmission of Power by Leather Belting," illustrated by lantern slides. It will be a comprehensive summing up of the theory and practice of belting in which conclusions are drawn from the work of Lewis, Bancroft, Bird and others, who have made experiments upon the transmission of power by belting. Valuable charts have been prepared by the author for the solution of belting problems.

RAIL LAYING

In Canadian Northwest Continues—Steel Corporation Explores Temagami Holdings.

Toronto, Canada, Dec. 22.—A statement issued by the Grand Trunk Railway shows that on the western portion of the line, which is being built by the company, steel rails have been laid on 865 miles of track and 1,132 miles are under construction. Of the main line 609 miles are under survey, but not under construction, in addition to 130 miles of branch line. The portion still under survey lies chiefly in the mountain section between Wolfe Creek and Prince Rupert. An important link in the chain was completed by the construction of the Battle River bridge in the prairie section. It is a steel viaduct 770 feet long and 184 feet high consisting of 54 spans.

The United States Steel Corporation owns a deposit of iron ore on the southwestern arm of Lake Temagami, in Northern Ontario, and has five diamond drills at work testing its depth.

Delahay Bros., proprietors of the National Mfg. Co., Pembroke, Ont., whose factory was recently burned, have purchased a controlling interest in the Cossitt Co., of Brockville, Ont., manufacturer of agricultural implements and will remove their business to that town, operating the Cossitt factory on a more extensive scale.

The Canadian Iron & Foundry Co.'s works at Three Rivers, Que., were partially burned on Dec. 16, the machine, pattern and blacksmith shops being destroyed causing a loss of $15,000.

The Berry Pulverizer Co., Ltd., of Ottawa, Ont., has been formed by John E. Askwith, Robert Masson, Austin Berry and others with an authorized capital of $100,000.

Upson Stack Repairs.—The Upson Nut Co. blew in its stack at Cleveland, Dec. 16, after having completed thorough repairs. The stack was relined, a gas washer built, one stove relined, a new roof added to the casting house, a standpipe constructed in place of the yard tank and a concrete underground water conduit built. Another stove will be relined shortly.

At the annual meeting of the stockholders of the American Nut & Bolt Fastener Co., Pittsburg, the following directors were re-elected: Milton Bartley, J. M. Davidson, E. K. Harrison, David Winters, S. E. Brown, D. M. White, Robert Pitcairn Jr., Harvel Bartley and Dr. J. W. Dickson.

GARY'S FIGURES.

(Continued from first page.)

in the iron; coke, $3.93 per gross ton at furnace, or $4.15 in the iron; limestone, $1.06 per ton, or 49 cents per ton in the iron; scrap, 16 cents per ton in the iron: cinder and scale, 11 cents per ton of iron; cost of labor, etc., $1.37 per ton of iron, and depreciation, 40 cents, or total of $15.30, as an average of all furnaces. It was less at South Chicago. The price of $7.30 from 1902-1906 was low because ore was low at that time. Ores are becoming poorer in quality than formerly. As the quantity of ore decreases the cost of production increases. The price of iron ore has increased since 1906. Ores were running down in richness. In 1906 the Pittsburg mine produced ore containing 64.33 per cent iron; in 1907, 63.03 per cent. In the Menominee range in 1906 the Grenada mine gave ore running 59.16 per cent iron and in 1907 58.82 per cent iron.

Coke had increased in price since 1906. The increase would cause an increase probably of over 46 cents per ton of iron. About 1 1-5 net tons of coke were needed per ton of iron. It was not certain what saving there would be in saving the by-products of coke, yet the Steel Corporation was putting in the appliances at Gary, Ind., to save the by-products. Under the new conditions a mixture of Pocahontas coal and Pennsylvania coal would be used outside of that of the Connellsville district. It was because the latter was getting scarce that the change to the new form of oven was being made. The cost of producing coke at the oven was $1.75.

Judge Gary thought, on the whole, the Steel Corporation could produce much cheaper than competitors. On the same basis of depreciation and comparison at least $1 per ton advantage was enjoyed by the corporation. This came from better methods and equipments. He had made no allowance for difference in cost of ore or coke. Taking in these items the difference would be larger.

"Of course," said Judge Gary, "I am not speaking from the standpoint of the corporation, which owns its own transportation. From that standpoint the advantage is very much more—probably over $2."

At the opening of the afternoon session Judge Gary promised to file statements on the comparative cost of pig iron rails and structural steel.

Spanish and Cuban Ores.

Mr. Payne then inquired about the imports of Cuban and Spanish ores and the witness said the ores were good, the Spanish being similar to the old range ores, but not like the Mesabi. He thought Cuba was furnishing a good deal of Bessemer ore. The ores which have been mined came from the south coast, in the locality of Santiago; but lately a large body of ore has been discovered on the north coast. The Steel Corporation, said Judge Gary, sometimes bought pig iron. It was not buying any now, but 15 months ago it paid $18.75 f. o. b. Pittsburg to the Mahoning Valley furnaces.

Representative Underwood asked the witness about some minor discrepancies in his statement as to pig iron costs, the detailed costs of a ton of ore at Chicago footing up $3.61, as against $4.70.

The difference, the witness explained, is due to the fact that the figures quoted are based on actual mining and transportation cost to lower lake ports; which figures of cost would apply only to ore smelted in furnaces located on the lake shore, while the costs he furnished were the average for ore used in all their furnaces, inland as well as lake, and also to the fact that the figure of $4.70 includes the profit to the ore mining companies. On coke a similar discrepancy existed, the profit to the mining company there being 54 cents per gross ton of coke. Limestone profits had been eliminated in the estimate. The item of scrap was also placed at cost, free of profit. Labor and operation showed the average costs of these items at all the works.

Judge Gary said these allowances did not cut out the transportation profits realized by the Steel Corporation on its railroads and steamboats. These lines were assigned a profit equal to the difference between the costs of carriage and current rates as determined by independent transportation lines. Leaving out profits on coke and ore, the average for all their furnaces would be $12.65, the cost of a ton of pig at Chicago, less, about $12. It would cost more to land the ore for a ton of iron at Pittsburg than at South Chicago, but less to land a ton of coke. The cost of production of a ton of pig except at Pittsburg or South Chicago was thus $12.65 excluding all profits except transportation profits. The average cost of transportation for coke in a ton of pig iron was 85 cents. The average earnings per man per day in the constituent companies was $2.42 in 1907, as against $2.26 in 1902, outside of the Birmingham district.

Asked where he disposed of his pig iron product, he replied it was largely used where produced. The finished product from the Chicago furnaces was sent in all directions. From Birmingham the goods went north, west and southwest, but did not compete on the Eastern seaboard. The Eastern plants sold their goods from the Atlantic west to Chicago.

Judge Gary said $1.60 was the regular rate from the German to the American seaboard. The English rate was the same. On being asked about pig iron costs in Germany and Great Britain he said the best cost was $8.50 in the Lorraine district, which produced on the average at about $9.50 per ton. There were some furnaces where the cost was $7.75, but very few were as low as that. In England the cost would run about $9 per ton under favorable conditions. Mr. Schwab, said Judge Gary, was right in saying the labor cost of pig iron was about the same here as in England, but that this was secured by the use of more costly machinery, but this applied only to pig iron and not finished products. The transportation companies owned by the Steel Corporation averaged 55½ cents per ton profit on the ore. He then recurred to the basis of his depreciation estimate of 40 cents per ton. A blast furnace lasts about twenty years and makes 140,000 tons a year. Forty cents a ton about covers the cost of the furnace.

In answer to Mr. Clark, Judge Gary redescribed the Great Northern ore deal, and said $2.88 was the cost of the ore delivered at the lower lake port. Amplifying this, the witness said 40 cents per ton was the depreciation charge needed to supply if need to buy new ore to replace what had been used. He thought the cost of steel was perhaps $19 per ton at our Eastern furnaces and mills. The German manufacturers could lay down steel billets at $14.50 per ton on the Eastern seaboard.

In reply to questions from Mr. Randell as to competition offered at the eastern seaboard, Judge Gary replied:

Cost of German Imports.

Assuming that you could make pig iron in the Lorraine district at $8.50, as I think you can, the cost of conversion there into billets would be about $5 a ton. That would be $13.50. You add the freight charges, say $3, and it would be $16.50 for the billets in New York. Now, the cost of conversion at the eastern furnaces and mills is not less than $4, and, including all legitimate charges, I do not believe they can make pig iron for less than $15. Fifteen dollars and $5 would be $20. In other words, the German billets would be laid down in New York at $16.50, whereas the eastern mills at their mills would have to pay $20 for the same thing.

Mr. Randell—Then the fact of the matter is that without any tariff on any of these products the iron manufacturer in this country can control the American market as against the foreigner?

Judge Gary—My figures do not seem to show that.

Mr. Randell—The American manufacturers, you say, cannot control the American market?

Judge Gary—I do not say that controlling the market—

Mr. Randell—That is a very plain question.

Judge Gary—It is a very unfortunate question. Nobody can control any market.

Mr. Randell—Some people can control some markets and do.

Judge Gary—For how long a time?

Mr. Randell—It is according to how long—

Judge Gary—The man who attempts to control any market up or down is soon in the poorhouse.

Mr. Randell—No matter what may be the cost, the conditions in this country are such that, in your opinion, the iron manufacturers cannot control the American market without the help of the tariff? Is that your opinion?

Judge Gary—Yes; it is. You are speaking of the manufacturers generally?

Mr. Randell—Of the iron producers.

Judge Gary—I have made no answer in regard to the United States Steel Corporation. I don't know. I think, with reductions in the tariff, the United States Steel Corporation would endeavor to take care of itself; but I think that many, if not most, of our competitors would soon be out of business, and we would have the field.

Mr. Randell—Then from a selfish standpoint, it would be to the interest of the United States Steel Corporation to take the tariff off?

Judge Gary—You might think so, but I do not think so. I think that it would be the worst thing that could happen to the United States Steel, because the people would not stand it. We do not want those conditions, and instead of trying to bring about such conditions as that, we have done what we could, fairly and justly, to prevent it and to assist our competitors.

Mr. Randell next asked whether a large part of the cost of iron was not composed of transportation charges. Judge Gary assented, but denied that Steel and railroad interests were jointly controlled to any marked degree.

Mr. Randell then tried to establish the existence of a joint agreement between the steel companies and the railroads to tax the consumer, and Judge Gary answered: "I know of no case where that is a fact; where your premises are justified by the fact."

The witness further said, in answer to a question how long the steel tariff would be necessary, that "You might as well ask me how long a string is as to ask me in regard to the future."

Mr. Randell at once diverged into a long series of questions designed to show the existence of a conspiracy among manufacturers to oppress labor. Thus a considerable period was lost in continuous wrangling.

After this interlude Chairman Payne inquired at what cost German ores could be laid down in New York, and the witness said he did not know. Three tons of German or English ore were about equal to two tons of American ore. It would cost about $11.50 to lay down a ton of German pig iron in New York and about $12 for English.

Why Not German Supremacy?

Chairman Payne—Why, then, does not Germany drive you out of the market? Seven dollars and fifty cents and $4 added would make $11.50 against your $15.50 cost.

Judge Gary—Eight dollars and fifty cents and $3 added would be $11.50, and the tariff, $4, $15 50. If they had a surplus of iron at any time, of course, it would come in here; it does come in here, lots of it.

Chairman Payne—Then there is nothing but their need for it for their own manufacturing purposes that keeps it out?

Judge Gary—That is exactly right. Selling pig iron, German pig iron, would not pay them very well, and they can do very much better by converting it into steel of all kinds.

Chairman Payne—Would the same rule apply if the $4 were taken off the duty?

Judge Gary—That I cannot answer; I do not know.

Chairman Payne—England has no surplus of iron ore?

Judge Gary—No.

Chairman Payne—She uses all in manufacturing what she mines and imports?

Judge Gary—She has no surplus of pig iron, I should say.

Chairman Payne—She does not export pig iron?

Judge Gary—No. It pays better to convert it. They do a very large export business of the finished steel.

Chairman Payne—Certainly; but I mean either as pig iron or ore, she does not export to any extent?

Judge Gary—No. My impression would be that she would not do it—that she will not do it.

Mr. Clark—Do you believe it would make any difference with the steel business if the tariff were taken off pig iron and ore?

Judge Gary—I can not answer that question. It would be an opinion.

Chairman Payne here interposed a question whether the United States Steel Corporation had thrown open its books to the experts of the bureau of corporations. "We were leaders in doing that," rejoined Judge Gary, adding that the bureau had spent three years with a force of competent men going over the books of the company.

"The total output of the companies examined by the bureau," said Mr. Payne, "was 93 per cent of the total output of pig iron in this country and for a period of five years past the average cost of pig iron is set by them at $14.01 per ton."

"Of course the basis is different, evidently. The cost last year, which I have given you, must be considerably less than the cost this year. In those figures they could not have allowed any profit to the mining company," replied the witness.

Chairman Payne then endeavored to show that the work of the bureau pointed to a cost of not over $13 per ton of pig iron, but Judge Gary refused to accept the idea.

Chairman Payne then turned to the rail question and asked how much pig iron was required to make a ton of rails.

Judge Gary said the Steel Corporation found that for Bessemer rails $15.06 was the cost of pig; conversion cost, pig to ingots, $2.88; ingots to rails, $3.22; depreciation, 84 cents; administration and taxes, 81 cents, or a total cost of $22.81.

"The average cost," said Mr. Payne, "was $22.33 on the basis of the bureau of corporation's figures."

"These figures," said Judge Gary, "must exclude all items of profit."

Asked as to the profits of the corporation, Judge Gary replied: "We have earned on all the capital including bonds 7.3 per cent."

No Objection to Publicity.

Chairman Payne—Have you any objection to the bureau of corporations giving over to us what is submitted to them originally as confidential, the results which they obtained?

Judge Gary—We have no objection. * * * I do not know what that may lead to as affecting our business relations with one another, but during the last year we have been pretty frank with one another anyhow; but we have got to stand, and that will be my position. We have to stand on the merits of the proposition, whatever the merits may be, based on actual figures. * * * Of course the business man can see that there is some objection to a manufacturer making public the costs relating to his production, because that extends not only to this country but also to every other country; and while we have that with reference to some of the products abroad, we have not got it with reference to a good many, and we are doing business at neutral ports with foreign countries. Still your question is such that I do not see how we can very well answer except to allow it.

Referring to the usually asked price of steel rails, Mr. Clark asked: How did it happen that they all got on to this $28 price?

Judge Gary—The $28 price started, I think, in 1899. That was the result of conferences and discussions between the steel makers as to what would be a fair price, and perhaps more or less talk with the railroad companies. Since that time the steel manufacturers have adhered to that price as a fair price. The manufacturers have no regular meetings, have no agreements, and have no way of fixing that price, but I doubt if any one of them would change the price without telling the others he was going to change it. The price has seemed to all concerned to be fair and reasonable, and the adherence to that price, in my judgment, is the result of knowledge and information on the part of all in regard to the business of each. In other words, publicity of each other's business.

Replying to questions which had to do with probably increased sales of rails if the price were reduced through a reduction of the tariff, Judge Gary said:

Gary's Tariff Opinions.

I think the question should be approached from the other standpoint, as a matter of opinion; that is, I do not think that a manufacturer should be allowed, on account of tariff laws or anything else, to charge or receive more than a fair return on the value of his property and the amount of business done. I think that is where you ought to start. Now, if he does not charge more than that price then he should not be compelled to sell at less than that price, that is, the fair price; and in that case if he can keep that price down to a fair basis by exporting the surplus, by "dumping" the surplus, it seems to me that it is good business, and works to the benefit of the domestic user, because it reduces the total cost of production on the part of the mill which runs full, keeps the men employed and, as a total result, is beneficial. I think it is the same argument that every man in every kind of business uses in disposing of his surplus. So I think about this tariff question—I think in some way the manufacturer ought to be restricted to fair dealings with the public on the basis I have suggested, without the introduction of the tariff laws or anything else that might be very harmful to some of the industries and to the working people. That is my theory. I am speaking as an individual.

Mr. Clark—Have you any idea how that thing could be accomplished?

Judge Gary—Personally, I have.

Mr. Clark—What is that?

Judge Gary—Publicity and government control.

Mr. Clark—Government control of the railroads and other industries?

Judge Gary—Yes; government control as distinguished from government management. I am not talking about that; I think that would be a failure. But I believe in thorough publicity on the part of corporations, railroads and manufacturing concerns, and I believe in the government having some way of controlling the manufacturer within reasonable bounds. I think this tariff question should be determined at the point where real protection leaves off and opportunity to oppress begins. * * * Therefore it is only a question of figures.

Mr. Carnegie's Testimony.

Andrew Carnegie, in response to a subpena, appeared before the ways and means committee, Dec. 21. He reiterated his printed declaration that the steel industry needs no protection from the tariff. For several hours he was on the witness stand giving answers mingled with humor and epigram.

Mr. Carnegie suggested that congress should give a vote of thanks to Mr. Schwab for his work in improving the methods of steel making in this country.

"I never met his equal," said he, "and when we were partners we were a great team."

"That is very apparent," remarked Chairman Payne.

Remarking upon the testimony of Judge Gary, the witness observed:

"You should not place any real value on the testimony of interested parties. Judge Gary said that the United States Steel Corporation could stand for a reduction in the tariff on steel, but that the smaller steel manufacturers could not survive with lowered duties. That is like one of Aesop's fables. Judge Gary is like the monkey who desired the chestnuts, but wanted the cat to pull them out of the fire."

Mr. Carnegie avoided direct replies to questions as to whether the cost of producing steel at the present time, as given by Judge Gary and Mr. Schwab, was correct. "Mr. Schwab's estimate of the present cost is based on entirely different ideas than his estimate on the cost in 1899," was all that Mr. Carnegie would say.

"Judge Gary has summarized the facts for you," said Mr. Carnegie, "and I should depend on them. He has told you that they don't need the duty. If the cost of steel rails has increased abroad as it has increased here, you will find Judge Gary's statement quite true, and that he could stand free trade."

"Judge Gary has testified that the price is as high abroad," said Chairman Payne.

"Then, doesn't that show you that you have nothing to fear from free trade," was the prompt rejoinder.

Mr. Carnegie was questioned at length regarding the cost of producing steel, but the witness declared that honest men easily could differ on that question. The steel business, he said, was a business by itself, and the cost to one man was a very different thing from the cost to another.

INSPECTED GREAT ENGINE AT DUQUESNE.

About 250 members and friends of the Engineers' Society of Western Pennsylvania inspected the operation of the 20,000-horsepower twin-tandem compound reversing steam engine at the Duquesne works of the Carnegie Steel Co., Friday evening, Dec. 18. The giant engine which was built by Mackintosh, Hemphill & Co., Pittsburg, was installed direct-connected to a 40-inch blooming mill in the Duquesne works about Nov. 1, and has been in continuous operation since first being started. The twin engines are 44 and 70 x 60 and are designed to run at 100 to 150 revolutions per minute. The total weight is about 2,100,000 pounds and 24 cars were required in shipping. The erection work was done in four weeks. The smooth working of the great engine excited the admiration of the engineers in the inspecting party. The entertainment of the delegation was in charge of Homer H. Williams, general superintendent of the Duquesne mills, and representing Mackintosh, Hemphill & Co. In the crowd were Joseph Fawell, president; Wm. H. McFadden, vice president and general manager; Samuel McMillen, general superintendent; E. H. Haslem, chief mechanical engineer, and H. L. Schreck, assistant engineer.

F. J. Speckert, treasurer, Western Hardware & Metal Co., Seattle, has been appointed receiver for the National Steel & Wire Co., with a bond of $5,000 by the superior court. The plaintiffs are workmen who have been employed by the defendant company, and sue for $386 in wages, said to have been unpaid.

CONVENTION OF CEMENT USERS.

The National Association of Cement Users will hold its fifth annual convention in Cleveland, Jan. 11-16, 1909. The papers to be presented at this meeting will deal largely with the cost of concrete construction, and particularly with matters pertaining to rates of insurance and a suggested building code for concrete and reinforced concrete. In connection with the convention an exhibit of machinery and appliances for the use of cement will be held, in which many of the machines will be in operation. The exhibits will be classed and grouped, to afford an opportunity of comparing the relative merits of the various types of machinery.

The sessions of the convention will be held at the Hollenden, while the exhibits will be in Central armory. The tentative program adopted provides for a meeting of the executive board on Jan. 11, the opening of the exhibition and reception by the citizens of Cleveland. On Tuesday, the convention will be formally opened, the principal subject to be discussed being roads, streets, sidewalks, etc., at the morning session, and reinforced concrete costs at the afternoon session. The Wednesday morning session is reserved for reports of various committees on testing cement products, the report of the executive committee and for the election of officers. The Wednesday evening session will consider concrete residences, while the Thursday morning session will take up the subject of reinforced concrete for railroads, warehouses, subways and retaining walls. The Friday morning session will consider the question of insurance, laws and ordinances, and also costs of concrete in various forms. The Friday evening session will consider the subject of cement blocks. The headquarters of the association are in the Harrison building, Philadelphia.

CANADIAN IRON AND STEEL PLANTS.

The Canadian Supplement to the American Iron & Steel Association's directory of iron and steel works, corrected to Dec. 1, 1908, contains much interesting information relating to the Dominion of Canada. Details are given respecting plants in the following provinces: Nova Scotia, coke stacks six, rolling mills and steel works, five; New Brunswick, rolling mills, one; Quebec, three charcoal stacks, rolling mill and steel works, six completed and one being built; Ontario, blast furnaces, six complete and one rebuilding and two projected, electric plants two, rolling mills and steel works, twelve; tin plate and terne plate works, one. Of the completed furnaces, twelve use coke and three use charcoal. The annual capacity of the completed and rebuilding furnaces is 1,005,000 tons of coke pig iron, and 34,800 tons of charcoal pig. The two electric plants have an annual capacity of 2,500 tons.

Assembling Shops Building.—The Lozier Motor Co., Plattsburgh, N. Y., is erecting a new plant which will consist of a blacksmith shop, 90 x 50 feet, to be used for hand forging, hardening, brazing and annealing; a stock building, 60 x 50 feet, for storing rough bar stock, forgings, castings, etc., and an annex will be built to the machine shop, 150 x 162 feet, which will be used for assembling automobiles. A few machine tools will be installed in this building, but the various parts of motor cars will be produced in the company's present foundry and machine shop and assembled in the new plant.

PERSONAL.

J. S. Coffin, who has been elected vice president of the American Brake Shoe & Foundry Co., has resigned the vice presidency of the Galena Signal Oil Co.

Kingsley L. Martin, a distinguished bridge engineer, has been appointed chief engineer of the bridge department, New York city, succeeding Colin M. Ingersoll, who will continue as consulting engineer.

Chas. A. Schieren, head of the New York leather belting house which bears his name, is one of the committee of nine appointed by Governor Hughes to investigate the New York stock exchange.

Charles T. Main, of Boston, has been appointed by the council of the American Society of Mechanical Engineers a member of the National Conservation Committee, with special reference to water power.

J. I. Andrews, assistant manager of sales of the American Sheet & Tin Plate Co., has returned to Pittsburg to assume Jan. 1, his new duties as general manager of sales of the company. Mr. Andrews has been in the south for the past several months for his health, and has been much benefited by his trip.

Geo. T. Oliver, of Pittsburg, has formally announced his candidacy for the office of United States senator from Pennsylvania, to succeed Philander C. Knox, who has been named as secretary of state in President-elect Taft's cabinet.

Thomas P. Egan, of the J. A. Fay & Egan Co., Cincinnati, is planning a European trip of two months, to be accompanied by his family, leaving about Jan. 5.

President George L. Pierson, of the Hamilton Iron & Steel Co., has resumed his duties at the plant after a short absence to enable him to recuperate from the arduous work attendant upon the organization and formal opening of the new works.

Allen Hill, who for four years has been connected with the South works, Sharon, Pa., of the Carnegie Steel Co., as assistant superintendent, has been appointed superintendent of the new open-hearth department of the National Tube Co., at Lorain, O.

Geo. A. Paff, superintendent of the South Sharon works of the American Steel & Wire Co., has tendered his resignation to take effect Dec. 31. Mr. Paff will go to Sterling, Ill., to take charge of the wire mill of the Griswold Wire Co. His successor has not been appointed.

T. W. Harvey Jr. has been appointed sales agent for the Independent Foundry Co., Portland, Ore. Mr. Harvey was for many years president of the Bell City Malleable Iron Co., Racine, Wis. He built this business up from a small beginning to a large output and about two years ago sold out.

OBITUARIES.

John J. Simmons, a resident of Chicago since 1845, died Dec. 16, in that city, aged 87 years. For many years he was connected with the iron and steel foundry business, and formerly was with the firm of N. F. Bouton & Co., but retired because of ill health.

E. S. Johnston, auditor and cashier for the Caldwell Brothers Co., Seattle machinery dealer, died at his home, 828 Tenth avenue, Dec. 13. Mr. Johnston was born in Providence, R. I., 50 years ago and had resided in Seattle for the past eight years.

Dr. Thomas Gray, vice president of Rose Polytechnic Institute and head of the department of Mechanical and Civil Engineering, died Dec. 19, at Terre Haute, Ind., after a long illness. Born in Lochgelly, Scotland, Feb. 4, 1850, he was graduated from Glasgow university in 1878. In 1881, and for seven years thereafter, he was the assistant of Lord Kelvin in electrical engineering. He was the author of several manuals on scientific observations, beside contributing papers on scientific and engineering subjects.

Wayne stack at Detroit of the Detroit Furnace Co. was blown in Dec. 17.

AMONG MACHINERY MAKERS.

BUFFALO.

Business Very Dull, but Improvement Is Expected.

Office of THE IRON TRADE REVIEW,
932 Ellicott Square, Dec. 22.

A reaction, unfavorable to the trade, is complained of in this market by the machinery dealers and the representatives of the large machinery manufacturers. This reaction seems the more acute by reason of the sudden spurt of good, substantial business which followed the November elections, and while business is not what could fairly be called depressed in this territory, it is very slack and rather apathetic. With the holidays near at hand, it is thought that a betterment can hardly be looked for prior to Jan. 1, when, it is predicted, a little more activity may be expected. During the past week, there have been a few transactions for light power equipment in Buffalo and through the state, but it was all of small character and the amount of money involved light. It is reported that no substantial sales for manufacturers' equipment were made, although there is some figuring on business for the early part of the year, but this is of an uncertain nature.

MILWAUKEE.

Contracts Awarded—Miscellaneous News From Wisconsin Cities.

Milwaukee, Wis., Dec. 21.—Plans for another new bascule bridge are being prepared by City Engineer Charles J. Poetsch of Milwaukee. The new structure will be erected at Oneida street.

The Milwaukee Bridge Co. has been awarded the contract for erecting the Twentieth street viaduct at Denver, Colo. The structure, which will be 5,000 feet long, will cost $1,000,000, involve the use of more than 4,000 tons of steel, and will be erected by the railroads whose tracks it crosses, the Chicago, Burlington & Quincy, the Union Pacific, the Colorado & Southern and the Denver & Northwestern.

Charging a breach of contract and asking that a receivership and accounting be granted, James T. Bannen has brought suit against his partner, Louis Kindling, in the Kindling Machinery Co., of Milwaukee. Judge Turner of the circuit court has issued a temporary injunction.

The Wisconsin Engine Co., of Corliss, Wis., has completed shipment of the water end of the 20,000,000-gallon, vertical, triple-expansion pumping engine which it is installing at Atlanta, Ga. This is the largest municipal pump in the entire south.

The Milwaukee Bridge Co. is the lowest bidder among five for the contract for the erection of the new bascule bridge across the Fox river at Green Bay, Wis. Its figure is $152,875, higher than the appropriation of the city council of Green Bay of $150,000.

The Cargill Coal Co., at Green Bay, Wis., has awarded a contract to the Milwaukee Bridge Co. for the construction of a new movable bridge to replace the structure destroyed by fire on Nov. 25. The new bridge will be 270 feet long and will be constructed entirely of iron. The bridge company will also furnish six new cars to the coal company and will conduct a general overhauling of the boilers and engines of the Cargill plant.

The Racine Mfg. Co., of Racine, Wis., has just received a heavy duty Corliss engine from the Wisconsin Engine Co., of Corliss, Wis., which is being installed to take care of the increased manufacturing facilities.

Work has been started on a new foundry at Green Bay, Wis., by Joseph Rothe, which when completed will be one of the most modern in eastern Wisconsin. The structure will be 120 x 80 and 34 feet high and will be of reinforced concrete. Only the foundation work will be completed this winter, but early in the spring operations will be pushed.

E. J. Kearney, secretary and treasurer of the Kearney & Trecker Co., well known manufacturer of milling machinery and planing equipment at West Allis, spoke before a recent meeting of the Milwaukee Engineers' Society on the subject, "The Construction and Use of Milling Machines." New members were elected to the organization as follows: Charles J. Poetsch, city engineer of Milwaukee; Henry C. Fuldner, W. F. Lathrop, Bernhard Elshoff, H. G. Pederson and David White.

The Eagle Chandelier Co., of Chicago, is said to have secured a lease on the plant formerly occupied by the now defunct Visible Typewriter Co., at Kenosha, Wis. The Kenosha branch will be an auxiliary establishment of the Chicago concern, which employs 2,000 men.

CINCINNATI.

Enough Inquiry to Show Improvement in Conditions.

Office of THE IRON TRADE REVIEW,
First National Bank Bldg., Dec. 22.

Not much is expected of the last month of the year as a usual proposition and the last month of this year in the machine tool business has brought about as much in the way of orders as could have been expected under the conditions. The shops are receiving occasional calls for machines of all kinds, which is encouraging, as it shows a betterment in conditions as compared with the situation prior to the month of November. November was about the best month since the depression began and while December will probably hardly equal the November business in the way of orders, there is enough business to confirm the general impression that the situation is gradually improving. When it is considered that business is interrupted with stock taking and the usual holiday preparations, the record of the month thus far may be regarded as satisfactory. Some of the shops have taken enough orders to run on full time and full force, while there are others which have not increased either working force or working time, and have considerable stock on hand. The most encouraging feature in the machine tool trade is the general disposition to regard the outlook for the new year with confidence. The past week has brought out but little that is interesting in the way of change in conditions.

It has been announced during the week that Philip Fosdick has sold his interest in the Kern Machine Tool Co. to Arthur Letherby, who for the past ten years has been superintendent of the Hamilton Machine Tool Co. Mr. Letherby becomes vice president of the Kern Machine Tool Co., of which Clifford Kern is president, and will come to Cincinnati about Jan. 1 to assume his new duties.

Efforts are being made to secure the 1910 convention of the National Gas and Gasolene Trades Association, a new organization recently formed at Chicago, and which will hold its convention there in February. The 1910 convention will have as an adjunct an exposition of gas and gasolene engine machinery. N. A. Loeb, of the Rock Island Battery Co., Albert Stritmatter and W. P. Williams, of

Cincinnati, are officers of the new organization.

PITTSBURG.

Machinery Lines Quiet, but Considerable Business Being Figured On.

Office of THE IRON TRADE REVIEW,
510 Park Bldg., Dec. 22.

In company with other lines, machinery conditions are showing the effect of the season of the year and are comparatively quiet. Makers are now clearing up their drafting rooms and are endeavoring to start the new year with as clean a record of work as possible. There is considerable work in heavy lines now under estimate and a good portion of this is expected to be released with the coming of spring and of a livelier general tone in business. Many of the foundries in this district which are dependent for their patronage upon active steel mill operations are showing no marked gains in going capacity.

The Ford City Power Co., capitalized at $5,000, has been incorporated by James McCullough Jr., F. A. Moesta, Chas. Moesta, John A. Fox and Henry E. Moesta, all of Kittanning, Pa., to furnish light, heat and power to neighboring towns. James McCullough Jr., Kittanning, Pa., is treasurer.

The cement plant of the Kosmos Portland Cement Co., Kosmosdale, Ky., which was recently destroyed by fire, is being rebuilt. Eight buildings of steel construction and with connecting bridges are being put up and the company has ordered the work rushed forward as rapidly as possible. W. N. Kratzer & Co., Pittsburg, have been awarded the contract for furnishing and erecting the steel work.

The Superior Steel Co., Carnegie, Pa., has inquiries out for a considerable amount of piping equipment in connection with the installation of a new hot-rolled department to its works.

The projected new steel works and finishing mills at Tarentum, Pa., in which J. B. McGinley, Julian Burdick, formerly of the Allegheny Steel Co., and associates are interested, are expected to show definite developments soon. The company has been formally incorporated and a full announcement of the plans contemplated is likely to be issued shortly.

The Scott Iron & Steel Co., which has acquired and remodeled the old plant of the Carnegie Tube Co. at Heidleburg, Pa., is expecting to start operations some time in January. The company will manufacture steel castings and horseshoes and has installed the necessary equipment for this line of production. George P. Steele is president and J. C. Stauffer, of Carnegie, Pa., secretary and treasurer of the company. John A. Scott, of Pittsburg, is interested.

NEW YORK.

Holiday Season Finds Business Very Quiet.

Office of THE IRON TRADE REVIEW,
Room 1005, No. 90 West St., Dec. 22.

The approach of the holidays has brought the usual inactivity to the machine tool trade, and current orders are by no means important. There is still an almost complete absence of railroad buying, but here and there small lists are being placed for the equipment of some moderate sized plant. Some attractive orders have been placed during the past week for the equipment of two new Jersey City plants, both recently noted in this column. For the beam shop of the Syracuse Bridge Co., to be operated as the Metropolitan Bridge Co., a considerable number of tools have been purchased, and some further buying has been done for the Drop Forging Co., of New York.

Looking back over the unfortunate business year just closing, the machine tool manufacturers and dealers find considerable satisfaction in the remarkable manner in which prices have withstood the trying conditions of the depression. Apparently only the builders of punching and shearing machinery, steam hammers and similar equipment in which the weight is extremely large, have suffered seriously from price-cutting.

The Brill Car Works, Philadelphia, have let the contract for a one-story steel frame storage house 40 x 160 feet, at Sixty-second street and Woodland avenue, to cost about $10,000.

The Edison Portland Cement Co., Stewartsville, N. J., has placed an order with the American Car & Foundry Co. for 75 heavy steel cars, and has inquiries in the market for considerable other equipment.

The Witherspoon Co., of Chicago, has been engaged by the Boston & Albany railroad to design a large all-steel grain elevator for erection at Boston. It is understood that this will resemble the all-steel elevator at Weehawken, N. J., in the construction of which 8,000 tons of steel was employed.

The stock and fixtures of the American Machinery Co., 651 West Forty-third street, New York city, have been purchased by the G. Drouve Co., Bridgeport, Conn.

SEATTLE.

Machinery for a Lumber Mill.—Much Opposition to Freight Rates.

Office of THE IRON TRADE REVIEW,
302 Pioneer Bldg., Dec. 22.

The decision of the Port Blakely Mill Co. to rebuild its big plant near Seattle, coupled with the actual commencement of work on the project has acted as a marked stimulus to the Pacific coast machinery market. Already about $50,000 of machinery for the new mill has been ordered with additional orders pending. D. E. Skinner, president of the Port Blakely Mill Co., of San Francisco, has been in Seattle several days arranging the details of the work. The new mill will be, like its predecessor which was destroyed by fire over a year ago, one of the largest in the world and will be fitted with every modern appliance for the economical manufacture of lumber. The Port Blakely office of the company advises us that, "nearly all the piles and most of the first flooring is completed and we expect to be in operation within the next five or six months."

The Pacific coast is aflame from southern California to Puget Sound over the increase in transcontinental freight rates, scheduled to take effect Jan. 1, and the Interstate Commerce Commission is being deluged with telegrams of protest. The iron trades form an important factor in the protesting movement. Rates on all iron trade products except pig iron and castings have been radically revised and in most cases raised. Delegates from the Pacific Hardware and Metal Association, the California Metal Trades Association and the United Metal Trades Association of the Pacific coast will attend the next meeting of the transcontinental freight bureau in Chicago in January to take steps toward obtaining measures of relief. The chief desire of the Pacific coast interests is to have the scope of the structural material grouping stringently curtailed.

The receivers of the Alaska Central railroad have received permission of the court to issue receivers' certificates for $25,000 to provide funds for keeping the property in repair. It is probable that some additional equipment will be purchased.

The Armstrong Machinery Co., Spokane, is to install ten vacuum pumps in the plant of the Hazelwood Co. at Opportunity, Wash.

The Halidie Machinery Co. is installing two high pressure boilers gine at the Stack-Gibbs Lumber and a 400-horsepower compound en- Co.'s mill at La Crosse, Idaho.

CLEVELAND.

Machinery Market Quiet—Jobbers Busy.

Office of THE IRON TRADE REVIEW,
Browning Building, Dec. 22.

During the past week the manufacturers and dealers in machinery have noticed a general lull in the market, due, no doubt, to the fact that books are being closed and accounts audited by most business concerns. What little business has been done has been to a great extent by jobbers and those receiving foreign orders. Woodworking machinery seems to be selling well. Several jobbing shops in this city have been so pressed with orders that it has been found necessary to work night and day. The situation in general, however, with the majority of manufacturers is one of hope rather than activity.

Inquiries last week were more numerous than in the week previous, which all goes to show that, after the new year has fairly commenced substantial orders will be placed and business will assume its normal activity.

The Cleveland Automatic Machine Co. is greatly encouraged by the increased number of orders for machines. During the past week several contracts were booked for machines to be shipped to the east, while six machines for the manufacture of collar buttons were booked for Buffalo. The working force is being added to as business requires.

The Standard Sand & Machinery Co., recently installed in the Peninsula plant, Detroit, belonging to the American Car & Foundry Co., a sand conveying and mold conveying plant for continuous pouring, with a capacity of 120 car wheels per hour.

The Cleveland Machine Knife Co. has been doing a business as good as that of any other month of the past few years. Shipments have been made to all parts of the world, and a recent contract calls for a rotary veneer cutter, 7 1/3 feet long, to be sent to London, England.

TABLET TO AMPERE.

Memory of French Scientist Was Honored Appropriately.

The memory of the eminent French scientist, Andre Marie Ampere, was honored by the dedication of a bronze and tile tablet in his honor in the Lackawanna railroad station at Ampere, N. J., by Dr. Schuyler Skaats Wheeler. The memorial was unveiled by M. Jusserand, the French ambassador, Thursday afternoon, Dec. 3, with a felicitous address.

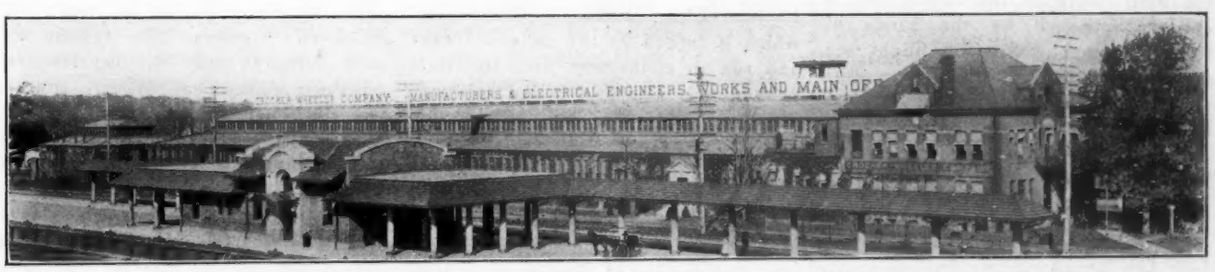
THE MEMORIAL TABLET.

Ampere, who founded the science of electro-dynamics and whose name is used throughout the world to designate the unit of electric current, was born at Lyons in 1775, and died at Marseilles in 1836. The only place in the world named for the distinguished Frenchman is Ampere, N. J., where are located the main office and works of the Crocker-Wheeler Co., and the tablet is probably the only memorial raised to his honor in America. In the course of his remarks, Ambasador Jusserand referred to the fact that he himself was born in the same town as Ampere, the great manufacturing town of Lyons, and further spoke in part as follows:

Ampere belonged to one of those austere French families which you never hear of—which are very rarely selected as a subject for novels and which are the average French family. His father was justice of the peace. He followed during the revolution the dictates of his conscience and suffered for it. He was beheaded and a few hours before his death, he wrote in a firm, steady hand, his farewell to his wife, who had been the faithful companion of his life. He said: "I have in my heart as a consolation the knowledge that I did my duty without fail. I leave you poor, but you will remember that it was through no squandering of mine, no lack of care. The only expense into which I went with some extravagance was for the purchase of mathematical and geometrical books for our little son. There is nothing that I do not expect of him." That little son was the great man whom you are honoring today, Andre Marie Ampere.

THE POSTOFFICE AT AMPERE.

Andre Marie Ampere grew up in Lyons and led such a life as his father and his grandfather and kin had led before him, a life devoted to study, to earnest pursuit of the highest aims of mankind. He lived an honorable life and as a man of duty he worked. What he did is noted in this city better than anywhere else. His great discoveries in electricity and electro dynamics have put him at the head of science, and these discoveries were the greatest which had been made in electric science since the days of Franklin.



RAILROAD STATION AT AMPERE, N. J., WHERE TABLET WAS PLACED AND UNVEILED.

IMPERIAL STEEL WORKS

Of the Japanese Government not a Failure, Says Director-General.

Y. Nakamura, director-general of the Imperial Steel Works, Japan, advises that the report circulated last spring that the government foundry and steel works is proving a failure is incorrect. The steel works is in full operation and employs a total of 7,000 men. The Imperial Steel Works is manufacturing the following articles: Structural shapes, rails, plates, sheets, galvanized, flat and corrugated sheets, rods, wire, tires, axles, crucible steel, bolts, nuts, spikes, rivets, shrapnel shells, etc.

The work of building the steel works was begun in 1897 and the plant, as originally laid out, was completed and placed in partial operation in 1901. Since that time, it has been in almost continuous use and has been greatly extended, improved and enlarged. The plant now includes three blast furnaces with a total daily capacity of 450 tons with pig casting machine, brick making plants and accessories; one battery of 11 ore roasting kilns; one 160-ton mixer and three large cupolas; ten basic 25-ton Siemens-Martin furnaces; three acid Bessemer converters of ten tons capacity each; cogging mills, rail mill, bar mill, plate mill, sheet mill, rod mills, etc.; crucible steel plant; wire drawing plant, galvanizing plant; boiler and bridge shop; 51 locomotives and 650 cars running on the works' railway, which is 45 miles in length; loading and unloading arrangements and quarters for 150 officers and 1,500 men.

In conclusion, Mr. Nakamura writes: "I do not deny that the steel works at present cannot reduce the cost of production as low as intended. Apart from the fact that the principal raw materials for iron and steel making are dearer than in the United States, our steel works has much difficulty in making so many varieties of products in sufficient quantities. But the Imperial Steel Works was founded by the long desire of the nation and is entirely managed by the hands of the government. So you might see that the steel works represents something more than profit or loss in production."

DRY BLAST ON BESSEMER WORKS IN GERMANY.

Licenses have recently been granted and preliminary work is now under way for the equipping of two blast furnaces and a Bessemer converter at Die Gewerkschaft Deutscher Kaiser, Hamborn, with the Gayley dry air blast. This adaptation of the system to the Bessemer converter, following close upon the original installation at the South works of the Illinois Steel Co., may be considered as additional evidence of its efficiency in that important direction. No further results of the South works experiments have been announced since the letter of Mr. Dudley some months ago. This has been due to a cessation of the experiments while the Bessemer connections were made permanent, a task which is now nearing completion.

COMBINING PLANTS.

The Indiana Rolling Mill Co., New Castle, Ind., advises that while it is erecting a new shovel factory, it is not in any manner increasing its former capacity. A serious fire during the summer badly damaged the shovel factory, and the company up to this time had never entirely repaired its plant. As it has another plant, a rolling mill, in another part of the city, the company decided not to repair the shovel factory on the site where the burned factory stood, but to remove the entire plant and combine it with the rolling mill. This is what it is doing at this time, and the new shovel factory is being located near the rolling mill, west of the city.

The company expects to occupy its new buildings about the first of the year, and hopes to be in a position to manufacture at lesser cost than formerly, as then it had to transfer all forgings from the rolling mill to the shovel plant by rail or dray. When the improvements are completed and the two plants are combined into one large factory, the company will roll its own steel, forge out the shovel plates and assemble the parts of the finished shovels under practically one roof.

John L. Wortham and associates are negotiating for the lease of the Sam Lanham blast furnace at Rusk, Tex., which is owned by the state of Texas and run in connection with the state penitentiary. The proposition has been discussed generally, but no decision arrived at as yet.

The Chesapeake & Ohio Coal & Coke Co. has opened an office at 1518 Bank of Commerce building, St. Louis, Mo., in charge of Frederick E. Coe as St. Louis manager.

CONFLICTING VIEWS

As to Whether Blast Furnace Operation Would Pay at Seattle.

The Pacific Northwest Society of Engineers held its regular monthly meeting Saturday, Dec. 5, at the society's rooms in the Lowman building, Seattle. President James C. Jeffery presided. The feature of the evening was a paper by Jas. D. Blackwell, chief engineer, Seattle General Contract Co., entitled "The Engineering Problems Connected with the Growth and Development of Manufacturing in Seattle."

Mr. Blackwell pointed out that in volume of manufacturing in proportion to its population Seattle is below the average city in the United States and that in order to establish permanent prosperity manufacturing must be stimulated and developed. He gave a list of industries that on account of unfavorable local conditions could not be successfully established in Seattle; this list included blast furnaces, open-hearth furnaces and cotton mills. Among the industries enumerated that could be successfully established were foundries, machine shops, steel ship yards, rolling mills and fabricating plants. The paper then pointed out that large areas of low, level land easily available by rail and water are necessary for the upbuilding of a manufacturing community and that the topography of Seattle practically limits its manufacturing centers to two districts, the Salmon Bay, Lake Union and Lake Washington region and the Duwamish river valley south of the city. Mr. Blackwell did not see much use in the proposed Lake Washington canal and the sea wall propositions but recommended that a commission of three or four responsible business men be appointed with power to lay out factory sites, take steps to prevent extortionate prices on the available manufacturing property, build docks and develop the east waterway and Duwanish river to their limit, straightening the river to Black River Junction and improving Spokane avenue.

In the discussion of the paper Mr. Blackwell's statement that a blast furnace industry could not be developed on Puget Sound was strongly attacked and the belief was expressed that such an industry could in time be built up sufficient in size to supply the local needs of the Pacific coast. It was also pointed out that the climatic conditions were peculiarly favorable to the cotton thread industry and that the only problem to be solved was one of labor.

MODERN ORE HANDLING MACHINERY.---III.

By Walter G. Stephan.

A late installation of ore handling machinery designed by Hoover & Mason, of Chicago, is at the new ore and coal dock of the Pennsylvania railroad at Ashtabula harbor, on the southern shore of Lake Erie. The Pennsylvania company's dock is located on the west bank of the Ashtabula river, on a tract of land which was reclaimed for this purpose from an area which was completely under water at the mouth of the river. Some idea of the great extent of this improvement can be obtained from the fact that the reclaimed area is about one-third of a mile long by 750 feet wide, and that over 2,000 feet of new dock was constructed. The new ore handling machinery consists of six Hoover & Mason ore unloaders and one Hoover & Mason ore bridge. In addition to these, a complete new power house and one additional McMyler coal car dumper were installed, the latter being capable of dumping the largest coal cars directly into the hold of a boat.

A good general view of the entire plant is given in Fig. 1, showing the unloaders and ore bridge in their positions relative to the ore yard, which is so arranged that cars can be conveniently supplied to the unloaders or car dumpers as desired with as little handling as possible. The tracks for loaded and empty cars are all made long enough to take an entire train, and the car dumpers are supplied with cars by gravity from a yard which is slightly elevated above the other tracks. From the dumpers the empty cars are carried by a switchback to another storage yard, from which they can be switched either to the main incoming track or to the ore unloaders beyond, or the empty cars can be dropped by gravity directly to the unloaders.

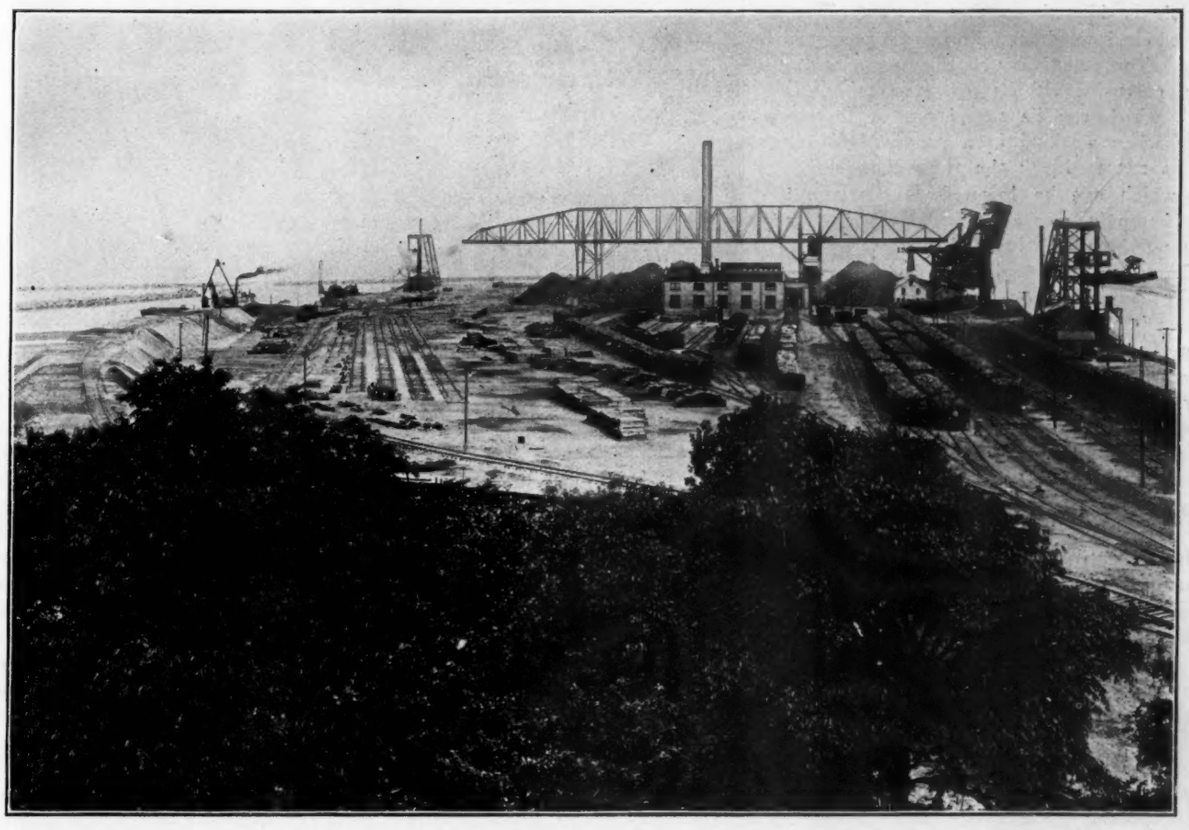


Fig. 1—General View of Ore and Coal Handling Plant of the Pennsylvania Railroad at Ashtabula Harbor, O.

The Ore Unloaders.

The ore unloaders are carried on front and rear legs, as shown in Fig. 2. The front legs travel on double rail tracks laid on top of the solid concrete face of the dock, which rests upon 12 x 12-inch timber cribbing underneath. The rear legs run on double rail tracks laid on top of a concrete wall which forms the water side of a V-shaped trough extending underneath the cantilevers of the unloaders and the rehandling bridge for a distance of 800 feet. The construction of this trough is interesting and is well illustrated in Fig. 3, which shows it in the process of making. The trough is built between two solid concrete walls about 35 feet center to center at the top, and the depth of the V is 17 feet in round figures, the bottom being rounded to a radius of about 3 feet 6 inches. As a protection from the steel scoops of the bucket, six standard T rails are imbedded in the concrete bottom, as shown in the sectional elevation, Fig. 4, the rails running longitudinally and being spliced with standard splice bars. The trough proper is made of a shell of concrete about 18 inches thick, except at the bottom, where the thickness was increased to 24 inches, and between this

shell and the two supporting concrete walls is a filling of rock. As completed, this construction looks like a solid concrete trough, whereas it is really made up of considerable rock filling.

The track for the rear leg of the unloaders, which is on top of the trough wall on the water side, is made up of two 85-pound rails 3 feet 6 inches centers, spiked to ties which are laid on top of the concrete wall and drift bolted to it.

The legs of the unloaders are 32 feet center to center and span two standard gage tracks 12-foot centers. The main frame consists of a stiff structural frame work, supporting a double cantilever, the front end of which is hinged so that it can be raised or lowerd to a horizontal position. The peculiarity of this boom is the extension at its extreme outer end, which can be raised out of the way when working in a narrow boat so as not to block the river channel, or which can be lowered to extend the boom in case a particularly wide-beamed boat is being unloaded.

Traveling on a double rail horizontal track supported on the frame work above is a man trolley operating a six-ton Hoover & Mason grab bucket suspended by four operating ropes, two for opening and two for closing the bucket. The trolley track extends back over 40 feet from the rear leg over the V trough on the land side, supported on a cantilever extension to the main frame, while the boom allows the trolley to travel far enough out so that the bucket can reach the farthest side of a boat of 65 feet beam. These unloaders are the first Hoover & Mason machines to be built with horizontal booms and trolley tracks.

Two 36-inch drums, each geared to a 125-horsepower motor mounted in the trolley frame, are used to operate the bucket, one for closing and one for opening. The four bucket ropes are reeved over sheaves in the trolley, those from which the bucket is suspended being mounted on a rotating frame operated by a 7½-horsepower motor. This latter arrangement allows the operator to swing the bucket either lengthwise of the hatch to enter it, or crosswise of the hatch so as to reach the ore between the hatches.

The trolley is mounted on eight equalized wheels, four of them being motor-driven. The operator is stationed in a cab hung from the trolley frame and he controls all the motions

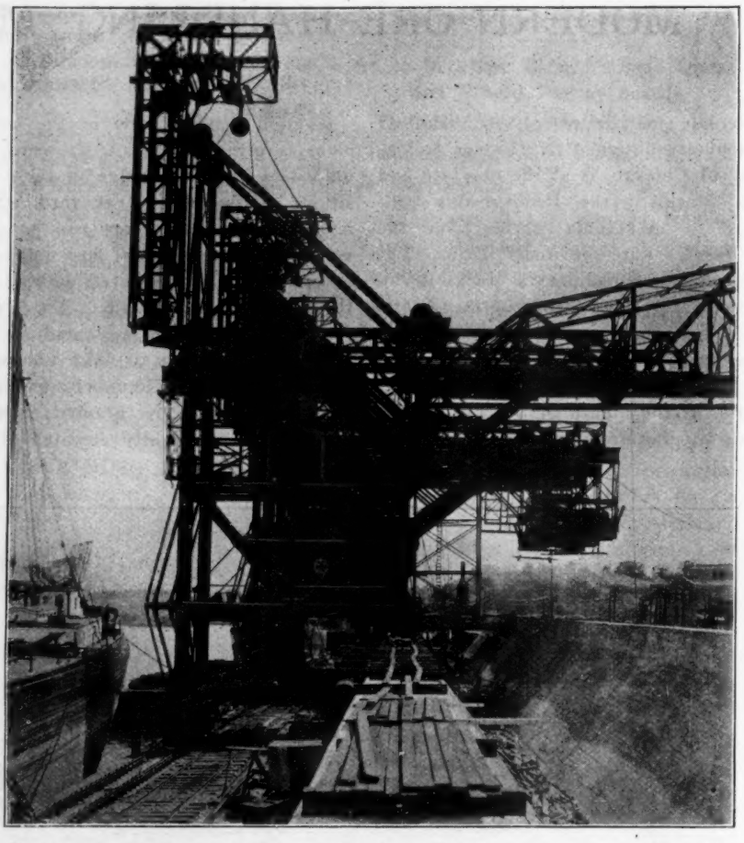


FIG. 2—DETAILS OF CONSTRUCTION OF UNLOADERS, PHOTOGRAPH TAKEN JUNE, 1907.

of the bucket and the trolley as well from his cab. In addition to this, he controls the movement of the unloader along the dock when moving from hatch to hatch, by means of foot levers and controllers conveniently located on the floor of the cab within his easy reach. The trolley track is provided with stops and electric safety devices to prevent over-travel of the trolley in either direction, and a safety stop is provided on the front end of the main frame to prevent the trolley from traveling out over the water when the boom is up. The longitudinal movement of the unloaders is accomplished by means of motor-driven drums mounted on the front and rear truck beams, one on each leg. On each drum is wound several turns of 1-inch cable, the two ends of the cable being carried to opposite ends of the unloader runway where they are securely anchored. By rotating these drums, one set of cables is wound in while the other set is unwound. Both drums are connected by shafting and gearing to two 35-horsepower motors mounted on the main frame beside the weighing hoppers.

This arrangement for longitudinal travel provides for two ropes leading in opposite directions from a drum on each leg of the six machines, consequently there are six ropes running to the anchor at the end of the runway from the front legs and six to each anchor from the rear legs. The drums are so placed that these ropes do not interfere with each other and each machine can be moved independently of the others. A brake is provided on the horizontal connecting shaft on the frame, which is powerful enough to hold the machine from skidding on the track.

The boom is raised and lowered by means of cables, which are so reeved that the boom itself can be lowered until its weight is carried on the boom rods—that it, until it is horizontal—without disturbing the boom extension. Then by slacking still further on these same cables, the boom extension is lowered into a horizontal position. When raising the boom the extension is automatically folded up at right angles first before the boom proper begins to lift.

The boom hoisting drum is located just behind the connection of the mast brace, with the main tower on top of the frame, and is driven by a 50-

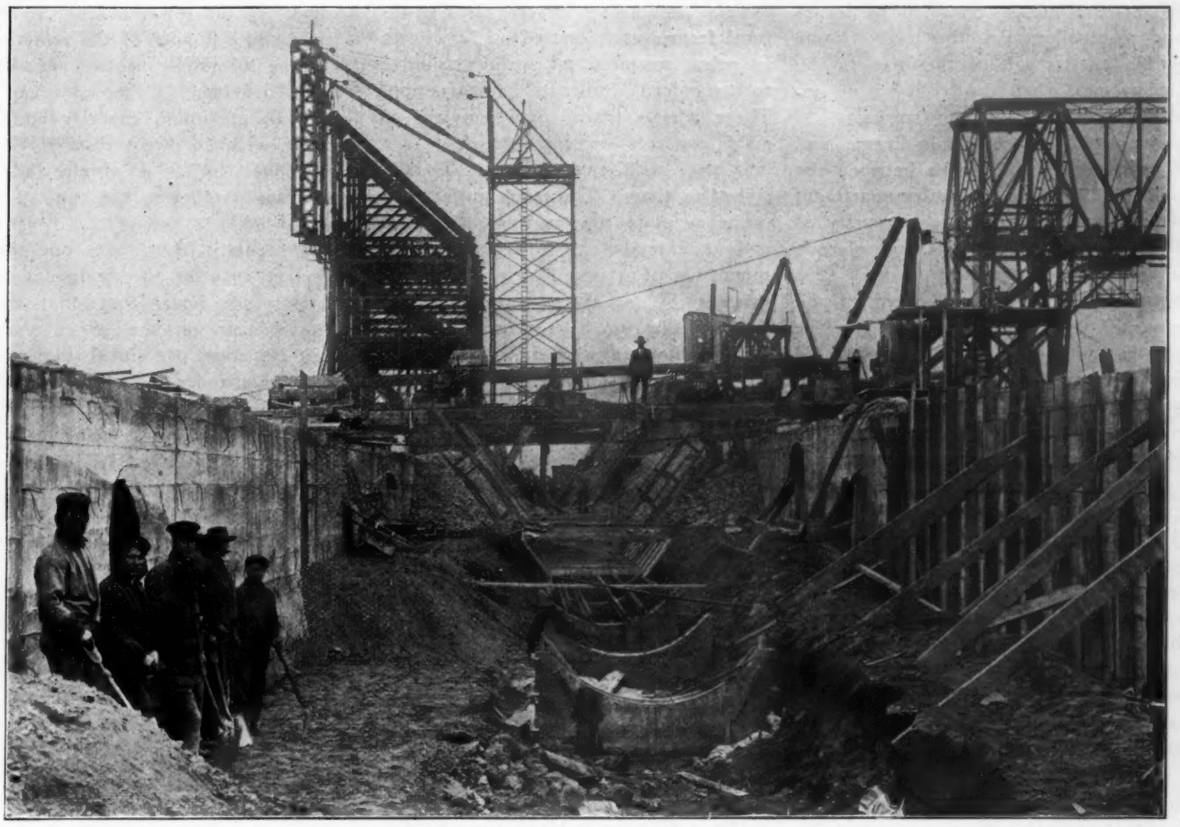


FIG. 3—V-SHAPED ORE TROUGH UNDER CONSTRUCTION.

FIG. 4—VIEW SHOWING GREAT LENGTH OF ORE BRIDGE AND A NEAR VIEW OF COMPLETED ORE TROUGH.

horsepower motor, operated by levers and controllers on the main frame within easy reach of the man in the trolley cab, when the trolley is in position over the unloader tracks.

Supported in the main frame and directly above the tracks between the unloader legs is a two-compartment weighing hopper having a capacity of 180,000 pounds. At the bottom of each of the two chutes leading from this hopper is a smooth-faced drum mounted horizontally which can be rotated by means of a motor located in the space between the two compartments. By rotating these drums in opposite directions, ore is fed from the hopper into cars standing on the rear tracks under the unloader, and a car loaded in from 20 to 30 seconds. The hopper rests upon scales of special construction, which are read and operated by a weighman who walks along a plank walk supported on brackets on the water side of the trough, as shown in Fig. 4. These scales weigh accurately and cars are loaded uniformly to their maximum capacity.

Current is supplied to the six unloaders from an insulated bar iron conductor mounted on extended ties at the top of the wall supporting the rear legs. Contact shoes on the rear trucks carry the current from the conductor rails on to the unloaders from which point it is wired to the various electric motors needed to operate the machine.

The maximum capacity of each machine is over 300 tons per hour when unloading the first half of a cargo of ore. Four or five shovellers are required in the hold of the boat, to help clean up, but these are not necessary until the greater portion of the cargo has been unloaded automatically. With the new wide opening grabs now being installed—opening over 18 feet—the cleaning up labor will be brought to a minimum.

The Ore Rehandling Bridge.

In order to be able to stock the ore unloaded into the trough by the six machines previously described, a Hoover & Mason ore stocking bridge is provided on the land side of the trough which consists of a double riveted truss supported on two towers 242 feet center to center. Cantilevers about 150 feet long extend from the bridge beyond the towers at each end, making the total length of bridge about 550 feet. The cantilever at the east end extends over the ore trough and above the rear cantilevers on the unloaders. The two towers are heavy rectangular structural frames each carried on 32 wheels in pairs, mounted on springs, similar to standard railroad construction. These wheels travel upon runways of solid concrete on top of which are laid ties, with two standard T rails spiked to them. The truck girders are of heavy plate construction and either end is extended to provide for the mounting of a spool driven through gearing by a 35-horsepower motor. Around this spool is wound a steel cable which lays along the runway and is securely anchored at its far end. By turning the spool, the bridge is moved in either direction—longitudinally. The motion of the bridge is controlled from the operator's cab in the trolley which travels above. Each tower is carried on a roller nest on top of the truck girder which permits the bridge to skew about 15 degrees either side of the normal position, in case one tower in moving should for any reason get ahead of the other. This skewing also greatly assists in placing and delivering ore.

On the track which is supported from the cross frames of the bridge runs the man trolley which operates a 14-ton Hoover & Mason grab bucket. The trolley is carried on 10 heavy chilled wheels of which part of them are driven by four 35-horsepower motors geared to the axles. The bucket operating mechanism is similar to that on the trolley of the unloader with the exception that no mechanism is provided for turning the bucket to open lengthwise of the bridge as this is not necessary in stocking the ore, while on the unloaders the bucket has to be turned to open lengthwise of the hatch in order to go down into the hold.

The speed of travel of the trolley is about 800 feet per minute, while the speed of the bridge traveling longitudinally is about 60 feet per minute. The four 125-horsepower motors in the trolley, for hoisting, lowering, opening and closing the bucket are capable of hoisting the bucket and load at a maximum speed of about 175 feet per minute.

The man in the cab on the trolley controls all of the movements of the trolley bucket and bridge. The bridge traverse is accomplished by the two 35-horsepower motors located at the base of each tower, these motors being operated by controllers located in the cab of the trolley. Current is supplied to the bridge from conduit rails running along one side of the runway similar to those on the unloaders. In the tower nearer the river is a weighing hopper of the same general type as those on the unloaders. This is provided so that cars can be loaded to maximum capacity and accurately weighed direct from stock by the bridge itself. A single railroad track runs parallel to the runway and close to it.

The capacity of the ore pile under the main span of the bridge is over 600 tons per lineal foot—that under the cantilever on the water side is about 250 tons per lineal foot while the ore pile under the other cantilever will stock 350 tons per lineal foot. Thus the total ore stocking capacity of the bridge is over 1,200 tons per lineal foot, or about 970,000 tons in a length of 800 feet of runway.

The bridge has a maximum capacity of 400 tons per hour, carried from the ore trough to the center of the main span. An excellent view of the bridge and unloaders at closer range is given in Fig. 4, which gives a better idea of the great length of the ore bridge and emphasizes the stability of the structural design.

A NEW GRAB BUCKET.

The accompanying photographs illustrate a new type of clam shell bucket recently put on the market by

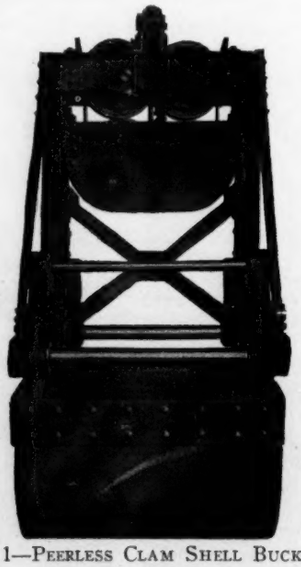


FIG. 1—PEERLESS CLAM SHELL BUCKET.

the Peerless Engineering Co., Cleveland. The bucket is made almost entirely of flat plates and bars, the only castings being the sheaves and bell cranks, which are steel castings.

The principal feature of the bucket is the arrangement of the lever system, which has a toggle action, giving a powerful digging and closing force. The arrangement of the bell cranks to

which the back of the scoops are hinged, give an exceptionally wide opening. Fig. 2, showing the bucket open, illustrates the manner in which the sheaves and working parts are always kept well out of reach of the material.

The bucket is opened by the chains

FIG. 2—PEERLESS CLAM SHELL OPEN.

attached from the small bell cranks at the top of head to the back end of the scoops, which gives a positive opening while holding the bucket in the same position. The arms connecting the scoops to the cross heads are built up of steel plates with lateral bracing connecting the arms with those on the opposite side of the scoops, thus insuring the rigidity and alignment of the scoops.

The construction of the cross head, forms a guard for the sheaves, which can be replaced in the shortest possible time by removing the cotter and slipping out the pin. The arrangement of the sheaves is such as to make it easy to reel in the cable.

A NEW SPEED COUNTER.

The Veeder Mfg. Co., Hartford, Conn., has placed on the market a new speed indicator, of unique design, which is stated to be entirely different from anything else for the same purpose now on the market. It uses for the registering apparatus one of the familiar revolution counters, which requires a complete revolution of its shaft to register one unit. The new indicator is capable of being run up to 10,000, which is capacity enough for all ordinary cases. The limit of speed for which the instrument is recommended is about 5,000 revolutions per minute. It can be used at higher speeds, but the wear is much greater at excessively high speeds.

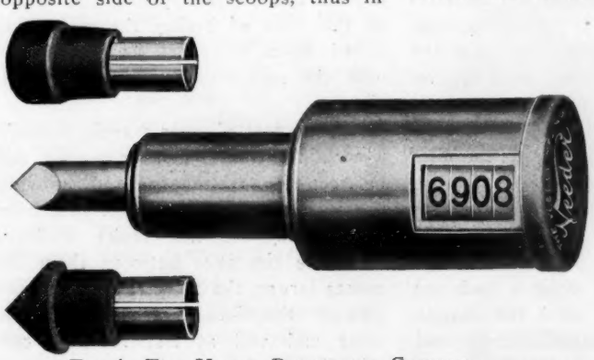


FIG. 1—THE VEEDER REVOLUTION COUNTER.

In Fig. 2 is shown the interior of the instrument. The register or counter is shown at A. At B is one part of a clutch with the other part at C. When the point of the instrument is free, the two parts of the clutch do not engage, being separated by the spring D. This spring is kept from interfering with the parts of the clutch by the sleeve F. When it is desired to use the counter, its point is placed against the center of the shaft whose speed it is desired to measure and a slight pressure on the end of the counter makes the two parts of the clutch engage. The counter instantly begins to register and will continue to register until the pressure is relieved.

To determine the actual number of revolutions, the reading of the counter must be taken before starting the count, as no setback arrangement is provided for bringing the register back to zero. This saves the bother of setting the counter back and is not inconvenient; any setback now made renders the instrument inaccurate. It is a very easy matter to jot down the reading of the register at the beginning and at the end of the period for which the count is taken and the difference between the two readings gives the count for the period desired. The counter works equally well in either direction. When run one way it substracts; when run the other it adds. In either case the difference of the reading gives the actual count.

The counter is extremely compact and weighs but a few ounces. Where it is desirable to use a counter in connection with electrical machinery the rubber tip shown is provided which effectually insulates the counter from any current there may be in the machinery.

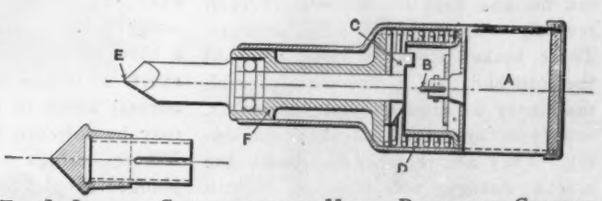


FIG. 2—INTERIOR CONSTRUCTION OF VEEDER REVOLUTION COUNTER.

The Acme Steel Package Co., Defiance, O., is closing down steadily its steel beer case department on account of the temperance wave that is sweeping over Ohio, and is placing additional machinery for the manufacture of steel oil barrels.

The Fraser River Lumber Co. has ordered eight large logging engines from the Washington Iron Works, Seattle. This is the largest order recorded this season in logging machinery. The consideration is about $40,000.

ELECTRICALLY OPERATED BRAKES FOR INDUSTRIAL PURPOSES[1]

By H. A. Steen.

The successful operation of machinery, driven by an electric motor, is largely dependent upon the auxiliary apparatus such as controllers, safety devices and brakes. The design of these parts requires careful consideration, as they are called upon to do the most strenuous and responsible work. This has not been fully appreciated in the past, the neglect has caused a great deal of trouble and loss, and the fact that the controlling devices must be as carefully designed as any other part of the machinery, has forced recognition. As a result these appliances have undergone many changes in the last few years and

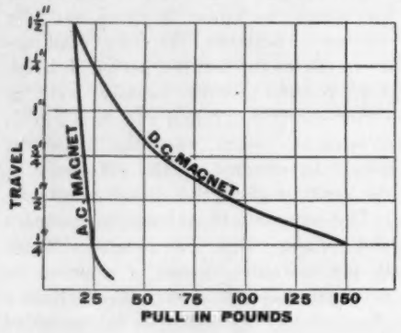


Fig. 1—Relation Between Pull and Travel in Direct and Alternating Current Magnets.

manufacturers have spent a great deal of money in development work, which has brought out some satisfactory designs.

This also holds true for electrically operated brakes, and this paper will place before you some typical modern designs, data for which have been recently obtained from manufacturers. These brakes serve to stop and hold the load and the moving parts of such machinery as cranes, hoists, elevators, conveyors and mill and shop machinery. They are required to absorb the kinetic energy, transforming it into heat, which is dissipated from the brake surface. They are generally called upon to brake for either direction of rotation and to produce an equal retarding effect in both cases. Only brakes of this description will be considered in this paper. The design of an efficient electrically operated brake involves more difficulties than that of most other brakes on account of the high speed, the limited power and travel allowed for the electro-responsive operating device and the required compactness of the brake mechanism.

The brake must be simple, easily adjustable and constant in its action. The wear must be slow and not affect the braking power noticeably, and the worn parts must be easily replaced. The retarding torque should be uniform and bring the machinery to rest without shocks and blows, and powerful enough to insure accurate stopping. Upon the correct design of the brake, its careful manufacture and maintenance, depends in a large degree the satisfactory performance of the machinery with which it is employed. One manufacturer of cranes expresses this in his catalog as follows: "The only part of our cranes, which require any special adjustment, are the brakes. If these are properly designed and adjusted our cranes will give entire satisfaction." The cost of the brake is small as compared with the total cost of the machinery and it does not pay to purchase a cheap brake if it is not the most satisfactory in every respect.

There are two classes of electrically operated brakes, one which employs weights and one which employs springs. The weights or springs apply the pressure to the wheel and the electro-responsive device generally releases the brake; a magnet is usually used for this purpose. If proper precautions are not taken the applied weight or the magnet plunger causes a blow on the wheel. This blow may exert a torque of many times the normal which in the case of a weight may be softened by using a dash pot. Where springs are used the magnet plunger should preferably be suspended, counteracting the spring pressure, and an overtravel of the plunger be arranged. This will prevent blows caused by the stored energy of the plunger. When springs are employed they should be placed so as to maintain practically an equal braking force without adjustment, until the wear has reached its maximum. Springs can now be made entirely safe and reliable if a rather low stress is used, from 25,000 to 50,000 pounds per square inch, depending upon the diameter of the wire and the coil.

Electro-Responsive Devices.

The function of these in general is to keep the friction shoes away from the wheel. In some brakes, not often used, the pressure is applied by the electro-responsive device, usually a magnet; but these will not be considered. In brakes of the type described here, pressure is applied to the wheel when the current is "off" the motor and the magnet. When the controller is turned to its first position, its function is to apply current to the magnet, which releases the brake, and allows the motor to start

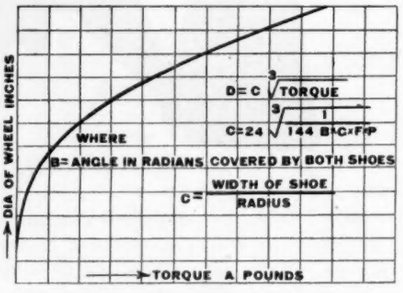


Fig. 2—Relation Between Torque and Dimensions of a Shoe Brake.

up. The magnet opposes and overpowers the forces applying the brake. In this type of brakes the magnet is called upon to exert as much pull with the maximum, as with a closed, air gap.

The magnet plunger travels through a certain distance, closing the air gap between its stationary and moving parts, thereby separating the shoe from the wheel. As the brake surfaces wear the clearance between them becomes larger, the travel of the magnet plunger therefore increases with the wear and will at last reach a certain limit, when a still greater travel will not be practicable, on account of the weakening of the pull by direct current and the increase of the current by alternating current magnets. An adjustment of the mechanism is therefore necessary to bring the plunger back to its initial, minimum, air gap. The allowable increase of the magnet travel should correspond to a fair amount of wear, about 1/32

[1] A paper read before the Engineers' Society of Western Pennsylvania, Oct. 20, 1908, and published in the Society's proceedings, page 385.

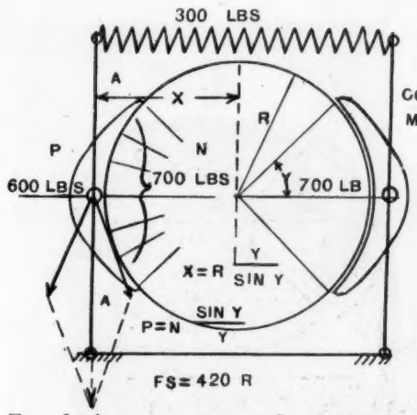


FIG. 3—ARRANGEMENT OF SHOE BRAKE WITH SHOE PIVOTED ON LEVER.

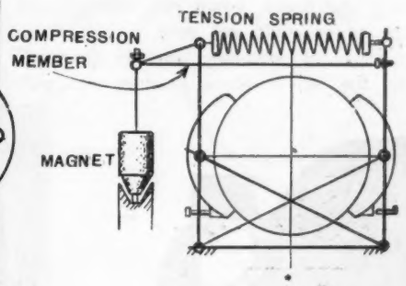


FIG. 4—ARRANGEMENT OF SHOE BRAKE WITH SHOE PIVOTED ON LEVER.

inch, so that adjustment should not be required too often.

Electro-responsive releasing devices may be divided into the following classes:

1—Direct current magnets; *a*, series; *b*, shunt; *c*, compound wound. 2—Alternating current magnets. 3—Turning armature magnets. 4—Motors.

Direct Current Magnets.

a, Series magnet: This magnet is connected in series with the motor, and must be designed to hold the brake open with the minimum motor current. When called upon to release the brake, it receives the heavy starting current of the motor at a time when it most needs it. After release has occurred and the motor has started up, the current drops, but now only a small current is necessary to hold the brake on account of the closed air gap. The series magnet automatically applies the brake if the motor circuit should be accidentally interrupted. The potential-difference across the terminals is very much less than the line voltage, rendering the insulation problem an easy one. This magnet has excellent characteristics as a releasing device and is the one most frequently used. In a few cases, where the armature current reverses or drops down to a very small value, it cannot be used.

b, Shunt magnet: This magnet is connected to the line in parallel with the motor and receives a constant current during the running periods, if a series resistance is not introduced at the end of its travel. The pull is therefore much larger than necessary with the closed air gap. Fig. 1, curve 1, shows the pull for different air gaps. The magnet must be insulated for more than the line voltage on account of the high tension induced by the field discharge when the current is broken. This high tension causes arcing on the contacts of the controller, which contacts have to be added when this type of magnet is used. The induced tension can be rendered harmless by connecting a field discharge resistance in parallel with the magnet coil. It also helps to prevent the magnet from closing the air gap. The shunt magnet requires some time for building up the field on account of its high induction. The action can be quickened by connecting a non-inductive resistance in series with it. By designing this magnet carefully its disadvantages may be minimized so that the introduction of the resistances mentioned would not be required.

c, Compound magnet: This has one series and one shunt coil. The series coil helps to pull at the beginning of the stroke and quickens the action, the shunt coil helps the series coil to hold the magnet closed. The electrical effect of one coil upon the other when starting and stopping must be considered, when the magnet is designed.

The preferred type of direct current magnets is the "iron clad" where the coil is entirely surrounded and protected by iron or steel. As the magnetic resistance of steel is approximately one-half that of iron, considerable saving in size and weight is effected by its use. By corrugating the "housing" the radiating surface can be considerably increased. The plunger is of round steel, guided in the housing and often coned at one end to increase the pull in the beginning of the travel. This is of great advantage if a shunt coil is used. The coil should be insulated and treated with a vacuum impregnating and drying process, which practically converts copper and insulation into one solid mass, excluding moisture from the interior and aiding in the dissipation of heat. The coil should be held in place so that it cannot turn or move axially. The lead wires from the shunt coil should be reinforced where they leave the coil, so that they cannot easily be torn off. There is generally an air space between the coil and the wall of the housing. The temperature may be kept lower by ventilating the housing or by introducing an insulating compound between the coil and housing which, however, would make it difficult to replace the coil.

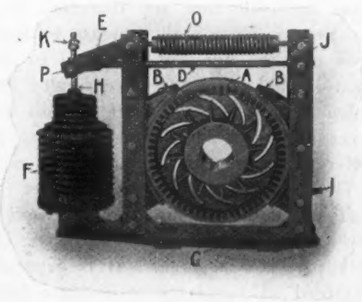


FIG. 5.

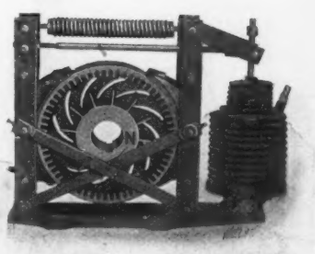


FIG. 6.

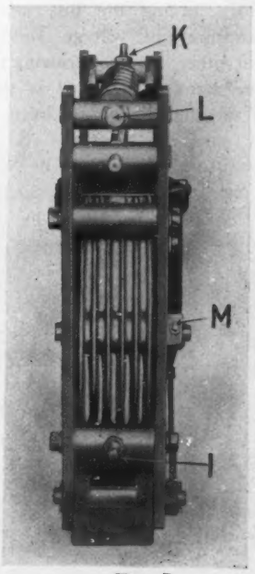


FIG. 7.

FIGS. 5-7—JAMES AND PARIS BRAKE.

Alternating Current Magnets.

These magnets must be connected to the line in parallel with the motor, like the direct current shunt magnet, on account of its high inductive resistance which would decrease the power factor of the motor if connected in series with it. The current required by them is approximately proportional to the air gap, within practical limits, and drops to a very small value after the air gap is closed. The pull increases slowly with the decrease of air gap and nearly doubles upon closing. Fig. 1, curve 2, shows the performance of these magnets. The arc of the magnet current on the controller contacts gives little trouble.

The principal difficulty in designing an alternating current brake lies in the fact that the large starting current of both the magnet and motor appear simultaneously, taxing the line heavily, causing variations in voltage and disturbances in other circuits drawing power from the same system. It is therefore of great importance to keep this magnet as small as possible. If the magnet core should stick at its maximum air gap, the current would soon blow the fuses or burn the coils. But in this position the magnet makes considerable noise, which would draw the attention of the operator to the fact that the brake would not release, and the motor could not start.

Single or polyphase magnets are used. In the single phase magnet the pull fluctuates with the current and reaches maximum and zero values from 50 to 120 times a second, depending upon the frequency of the current. This condition causes vibrations and a humming noise, especially when the magnet is closing. This can be lessened by placing a copper ring around one leg of the core in which a secondary current will be induced, which is out of phase with the main current. This induced current creates a field, which reaches its maximum and zero points at different times from the main flux and therefore does not permit the pull to decrease to zero. Two coils of different induction or capacity would effect the same result. The polyphase magnet is better in this respect as the two or more currents of different phase cause a more equal pull.

The alternating current magnet is built up of steel laminations to prevent eddy currents and the laminations are solidly riveted together. It is generally regarded as necessary to insulate bolts and rivets to prevent induced curcuits, but if these are few in number and are located properly, this should not be necessary. One, two or three coils are used and the cores have one, two or three legs. This magnet can hardly be made iron clad, but may be covered with a non-magnetic metal case.

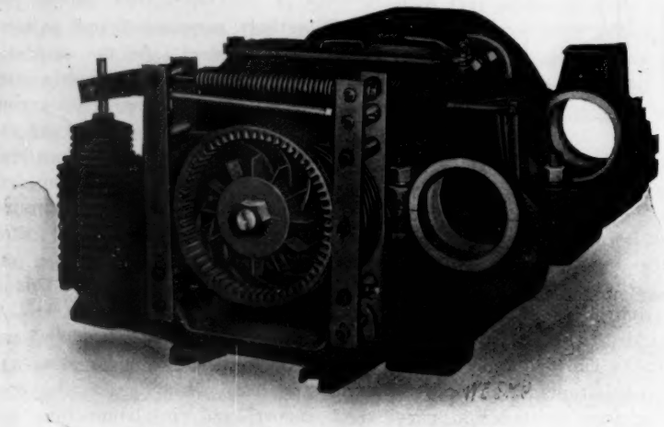


FIG. 8—JAMES AND PARIS' BRAKE.

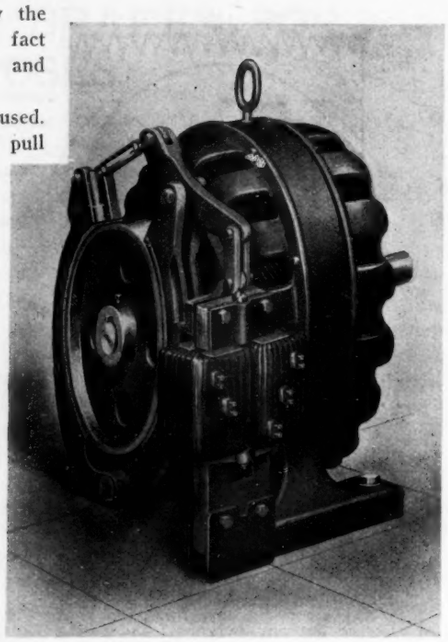


FIG. 9—ALTERNATING CURRENT BRAKE.

Turning Armature Magnets.

These have been used with a Z-shaped armature. By shaping the armature properly the torque can be made constant or be made to vary to suit the releasing mechanism.

Motors.

Motors are employed by a few manufacturers. They can in some cases be used to advantage especially for alternating currents. The starting current does not reach the value required by an alternating current magnet. The motor is made to rotate a part of a revolution exerting its static torque holding the brake open. The action of a motor is, however, slower than that of a magnet. Some designers have proposed to use a magnet or a motor, in

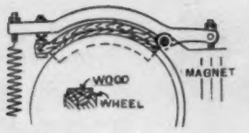


FIG. 10.

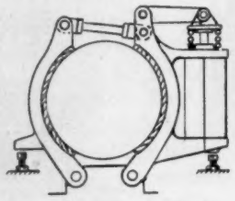


FIG. 11.

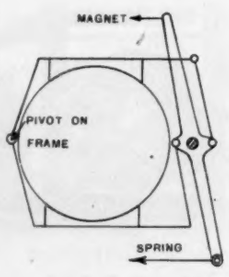


FIG. 12.

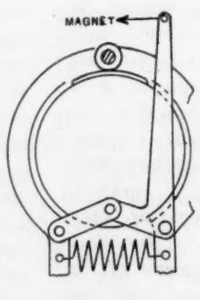


FIG. 13.

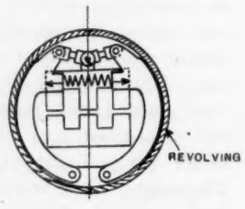


FIG. 14.

FIGS. 11-14—ARRANGEMENTS OF BRAKE SHOES.

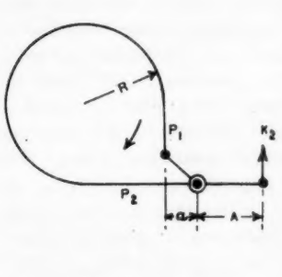


FIG. 15—NEW REVERSIBLE BAND BRAKE.

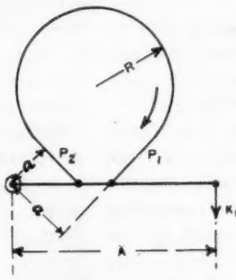


FIG. 16—REVERSIBLE BAND BRAKE

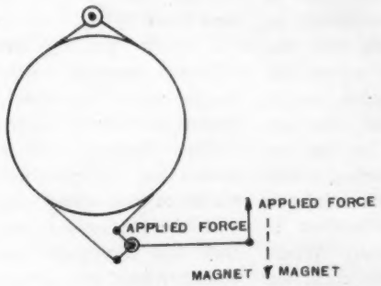


FIG. 17—REVERSIBLE BAND BRAKE WITH TWO-PART BAND.

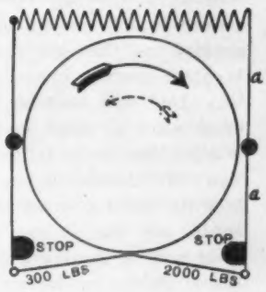


FIG. 18—ARRANGEMENT OF IMPROVED REVERSIBLE BAND BRAKE.

addition to the releasing device, for the purpose of varying the brake torque for different loads.

The kinetic energy, which the brake is called upon to consume may be calculated as follows:

For kinetic energy of translative motion, let E=kinetic energy in foot-pounds; W=weight in pounds of moving body; V=velocity in feet per minute; $E_1=0.00000432\ W\ V^2$.

For kinetic energy of rotating body in foot-pounds, let W_2=weight in pounds of rotating body; R_g=radius of gyration in inches; R. P. M.=revolutions per minute;

$E_2=0.00000119\ W^2\ R_g^2\ (R.\ P.\ M.)^2$; $E=E_1+E_2$; = total kinetic energy to be consumed and transformed into heat for one stop of the machinery.

The stored energy of the rotating parts E_2 is generally so much larger than E_1, that the latter can often be left out of consideration.

N=number of revolutions required to stop

$$=\frac{0.159\ E}{\text{torque}}$$

where the torque is expressed in foot pounds.

As the friction of the machinery aids the braking action, the value of N as given by the formula above is slightly too large.

T=time required to stop in seconds

$$=\frac{230\ E}{\text{R. P. M. x torque}}$$

The temperature rise of the brake wheel and shoe may be calculated as follows:

H=total heat for one stop

$$=\frac{E}{778}\text{B. T. U.}$$

Let S=specific heat of iron.=0.1138; P=weight in pounds of iron heated; R=coefficient of radiation=0.648 B. T. U. approximately (for 1 degree Fahr. rise per square foot per hour); A=radiating surface in square foot; t_1=temperature rise for one stop

$$=\frac{E}{778\times 0.1138\times P}$$

$$=\frac{H}{0.1138\times P.}$$

An example will illustrate an approximate calculation:

P=10 pounds, E=1,456 feet-pounds, A=1.1 square feet.

$$H=\text{B. T. U. per stop}=\frac{1,456}{778}$$

=1.87 B. T. U.; $t_1=\frac{1.87}{0.1138\ \text{x}\ 10}=$ 1.645 degrees Fahr. for one stop and the heat dissipated for 200 degrees rise of temperature is $200\times 1.1\times 0.648=$ 142.56 B. T. U. per hour, and the number of stops Y per hour for these conditions is:

$$Y=\frac{142.56}{1.87}=76 \text{ approximately.}$$

That is, 76 stops per hour or one stop every 48 seconds may be made without a rise of more than 200 degrees Fahr., which is entirely safe for iron. This calculation is only to be regarded as a fair approximation, as many factors such as ventilation, radiating surfaces, etc., cannot be accurately determined, but this gives a good idea of the heating conditions which may be expected.

Friction Materials.

The requirements for friction materials are a high and constant coefficient of friction, slow wearing qualities and rapid transmission of heat. The materials most frequently used are cast iron, steel, brass and bronze; and for linings and inserts maple, oak, ash, cottonwood, lignum vitae, fiber, cork and leather. The linings must be carefully

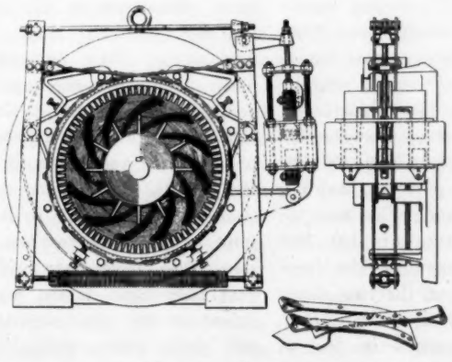


FIG. 19—CONSTRUCTION OF IMPROVED REVERSIBLE BAND BRAKE.

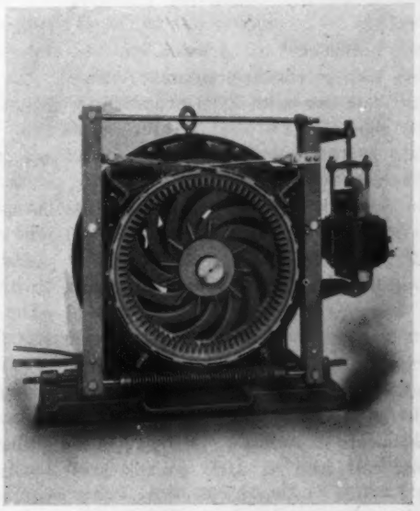


FIG. 20—IMPROVED REVERSIBLE BAND BRAKE ON MOTOR.

selected, as they are often the cause of serious trouble, and their use should be avoided as far as possible. It has been the practice in the past to use linings for slow running brakes, which often were of large diameter, and this practice has been followed in the design of electric motor brakes. But here the speed is great and the diameter small, and the linings are subject to great strains, heating and wear. Where elastic linings or inserts like cork, are used, their unavoidable compression necessitates an additional magnet travel and renders the magnet more inefficient. Although treated wood is used successfully with some designs, it can safely be said, that a great deal of brake trouble is due to unsuitable linings and inserts as they keep the heat on the wheel and are liable to warp, crack, be torn off or burned. An experiment showed that one brake wheel heated about twice as much with a lining as without it, the shoe in this case absorbing and radiating but little of the heat.

One manufacturing company has gone very thoroughly into the question of the most suitable friction materials. The best results were obtained by using cast iron on cast iron, and this firm is now building both shoe and band brakes with cast iron as the friction materail. Railroads use cast iron brake shoes and have found this to be the best material, and there is no reason why it should not be the best for electrically operated brakes. Bronze on cast iron is also good and is much used, especially for disc brakes.

The coefficient of friction of soft cast iron on cast iron has been found to average about 0.32. The coefficient varies with the pressure and speed but is not influenced by temperature within practical limits. Prof. R. A. Smart, of Purdue University, found the following results.[2]

The coefficient of friction, f, decreases with increased pressure. A shoe of soft cast iron with 2,000 pounds pressure showed $f=0.35$; with 8,300 pounds $f=0.22$ at a peripheral speed of 50 miles per hour.

The coefficient of friction decreased with increase of speed except from 10 to 20 miles per hour, between which it increases slightly. A shoe of soft cast iron with 7,000 pounds pressure showed $f=0.24$ at 10 miles, $f=0.27$ at 30 miles and $f=0.18$ at 70 miles per hour.

Soft cast iron gives a higher coefficient of friction than hard cast iron. Experiments showed:

Soft cast iron at 2,000 pounds pressure $f=0.35$

Hard cast iron at 2,000 pounds pressure $f=0.24$

[2]Western Railway Club Proceedings, September, 1900.

Types of Brakes.

Brakes may be divided into the following types: *a*, shoe brakes; *b*, band brakes, *c*, axially applied brakes.

Shoe Brakes: If a line of shoe brakes is so proportioned, that the width of the wheel face varies directly with the radius, the pressure per square inch and the angle intercepted by the shoe are kept the same for all sizes, we find that the torque exerted is equal to the cube of the diameter multiplied by a constant which is dependent on the coefficient of friction, the pressure per square inch, the angle intercepted by the shoe and the proportion between the radius and the width of wheel face.

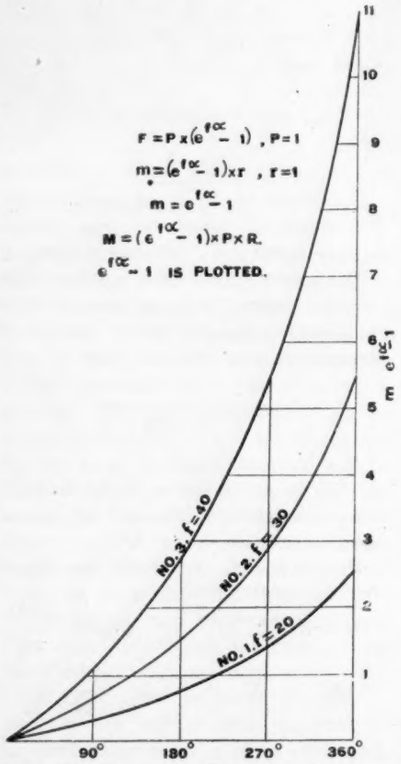


FIG. 21—RELATION BETWEEN BRAKING MOMENT AND ANGLE INTERCEPTED BY BAND.

In Fig. 2, these conditions are shown graphically and it is readily seen that the power of the brake increases rapidly with the diameter. The shoe may be pivoted or fastened to the brake lever. The fulcrum of the lever may be located on a line coincident with the direction of the braking force, causing compression in the lever, or it may be located inside or outside of that line causing a bending moment in the lever and unequal pressures on the two shoes.

If the shoe is pivoted on the lever, the pivot may be arranged in one of two ways. Either so as to cause wedging of the shoe, resulting in a heavier pressure at one end of the shoe than the other, dependent upon direction of rotation; or it may be located so as to distribute the pressure evenly over the entire surface. The first arrangement often causes "digging" of the shoe and therefore rapid wear and noise. The shoe must separate evenly from the wheel. The wheel may have a straight face or contain one or more V shaped grooves. The grooves effect a higher pressure by wedging the shoe. In this case substitute for f,

$$f_g = \frac{f}{\sin a + f \cos a}$$

where a is one-half the angle included by the faces of the groove. For $a =$ 30 degrees, 33 per cent is gained, but the machining is more difficult and the required travel of the magnet is greater. The wheel is, in some cases, ribbed and in one design is provided with vanes to promote cooling. The arms of the wheel should be curved to prevent excessive stresses caused by expansion, when the wheel is hot. The shoe may also be of the internal type, which in some cases gives a very compact arrangement.

Figs. 3 and 4 show a brake with the shoe pivoted on the lever so as to obtain equal pressures per square inch over the entire surface. All features concerning the correct arrangement of the magnet, spring, shoe and wheel previously pointed out in this paper are embodied in this brake. For more detailed information concerning it see H. D. James' article in the *Electric Club Journal of* May, 1908, which describes a brake developed by Mr. James and W. A. Paris. This brake is more fully illustrated in Figs. 5 to 8.

In Fig. 9 is shown an alternating current brake, other types of shoe brakes are shown in Figs. 10 to 14. The construction of these can be readily seen from the diagrams.

Band Brakes.

The design of an effective reversing band brake offers some difficult problems. Designers in the past have persistently failed to make this brake as efficient as the non-reversing band brake, being of the opinion that the force applied to the brake must overcome the retarding force in addition to the force applied to the other end of the band if equal effects for both directions of rotation are to be obtained. In spite of the imperfections of these designs they have been widely used. A reversible band brake, which is as efficient as the non-reversible band brake will find wide application, especially where it is of importance to make the

magnet small and the entire brake light. Such a brake has been developed and will be compared with other band brakes, and also with the shoe brake in the following analysis:

A—A simple non-reversible band brake is shown in Fig. 15, in which

$$P_2 = P_1 \times e^{f\,a}$$

as an example assume $e^{f\,a} = 6$; then $P_2 = 6\,P_1$ where e = base of the natural system of logarithms; f = coefficient of friction; = angle intercepted by brake band in radians. Then for the retarding force F

$$F = P_2 - P_1 = P_1\,(e^{f\,a} - 1)$$

$$F = 5P_1 \text{ or } P_1 = \frac{F}{5}$$

$$\text{Then } K_1 = \frac{F}{5} \times \frac{a}{A}$$

where K_1 is the applied force.

B—A reversible band brake of well known type, is shown in Fig. 16.

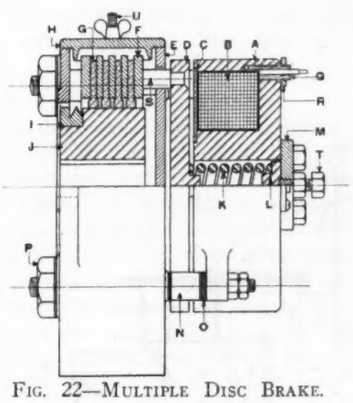


FIG. 22—MULTIPLE DISC BRAKE.

With same values of P_1, P_2, F, a and A as above we have the applied force K_2 as follows:

$$K_2 \times A = 7\,P_1\,a;\ P_1 = \frac{F}{5};$$

$$K_2 = 7\,\frac{F}{5}\,\frac{a}{A}$$

Comparing the brake shown in Fig. 15, with brake shown in Fig. 16, it is seen that for the same braking effect, the applied force for the reversible band brake commonly in use is seven times that of the non-reversible.

C—Fig. 17 shows the diagram of another reversible band brake, where the band is made in two parts. Each part covers only a small angle and the benefit of the rapidly increasing accumulation of power by the larger angles is lost. One band is also much looser than the other, and the retarding force derived from this must be overcome by the force applied to the brake. This arrangement is therefore very inefficient.

D—Figs. 18 and 19 show the new improved reversible band brake mentioned above and Fig. 20 shows this brake mounted on a motor. This has the following advantages:

The efficiency of this brake is a maximum and is as high as for the simple non-reversible brake; the full benefit of the band principle is obtained by crossing the ends of the band and covering practically the whole circumference of the wheel; the band proper consists of a cast iron cylinder, which is of slightly larger inside diameter than the wheel, therefore separating easily from the wheel and maintaining an even clearance which may be adjusted by set screws around the circumference; a steel band wrapped around the cylinder receives the applied force, transmitting this to the cylinder and the accumulated retarding force to stops on the frame; the mechanism is relieved of the high retarding strains, making the mechanism exceptionally light; the brake requires a very small magnet. In one case, a 65-pound magnet was required for a brake of 2,000 pounds retarding force on a radius of one foot. This brake is therefore especially applicable to alternating-current motors, where the magnet current must be kept low. This form of brake is light, simple and effective and has given excellent results.

It is of interest to compare this brake with a shoe brake. Fig. 3 shows a shoe brake where the retarding force is $F'_s = 1{,}400 \times 0.3\,R = 420\,R$ where 1,400 is the total pressure in pounds applied to wheel surface; 0.3 is the coefficient of friction, and R is radius of the wheel.

Fig. 18 shows a band brake where the retarding force is $F_b = (2000 - 300)\,R = 1{,}700\,R$, where 300 is the pull in pounds applied to one end of band, and 2,000 is the accumulated tension in the other end of band, due to rotation of wheel.

It will be noted that this improved band brake exerts approximately four times as great a retarding force as the shoe brake. The magnet is therefore only one-quarter of the size required by the shoe brake for the same retarding effect. The curves in Fig. 21 show clearly the relation between the braking moment and the angle intercepted by the band for three different coefficients of friction. For any other applied force, P, and radius of wheel, R, multiply the values of the unit retarding moment, m, by P and R for the total retarding moment M. Curve 2 shows an increase of approximately 100 per cent in the retarding moment for the last 90 degrees of the circle. This emphasizes the importance of intercepting as many degrees as possible. The power of this brake, like the shoe brake, increases rapidly with the diameter.

Axially Applied Brakes.

In this class of brakes the spring or springs and the magnet are placed around the shaft exerting pressure in an axial direction. The release magnet is somewhat stronger than the springs and the travel of the magnet is very small, varying from 1/16 inch to 3/16 inch. This brake can easily be made dust proof or oil tight. There are two principal types of these brakes, the disc and the conical brake.

Disc brakes are based on the well known Weston principle, described as early as 1868 in the Proceedings of the Institute of Mechanical Engineers. One stationary and one revolving set of disc plates are used. The stationary plates may be attached to the frame by bolts, or they may be made square and fitted into the frame. The revolving plates are

FIG. 23—FRAME OF MULTIPLE DISC BRAKE.

keyed to the shaft and interleave between the stationary plates. All the plates are free to move axially and to separate when the spring pressure is relieved by the magnet. The spring pressure is applied to the first stationary plate and transmitted through all the plates. The reaction is taken up by the frame. The retarding force is proportional to the number of surfaces in engageemnt. The "multiple" disc brake generally runs in oil, which has an effective cooling quality, keeps the plates from cutting and the coefficient of friction more constant. The stationary plates are of cast iron, the revolving ones of bronze or semi-steel. The stationary plates are in one make, provided with cork inserts forced into drilled holes. The value of the cork is said to lie not so much in its frictional qualities as in its ability to keep the plates clean and to act as wicks for lubricating the surfaces.

The wear is taken up by adjusting the

position of the magnet, which is bolted to the frame, or a new stationary plate may be inserted when the total amount of wear equals the thickness of one plate. The spring is adjusted by screws. When it is necessary for the shaft to be extended through the brake, the central spring is replaced by four springs at the circumference of the magnet armature plate. Fig. 22 is a section of a multiple disc brake and Fig. 23 is an outside view of the same. Fig. 24 shows the brake mounted on a motor. In some brakes only one disc, keyed to the shaft, is used. The armature and shaft of the motor are allowed to move axially approximately 1/16 inch, and the disc is, when in braking action, pressed between the magnet disc and the brake frame. Wooden inserts in the rotating disc or in the stationary brake surfaces are frequently used in this type, the grain of the wood running perpendicularly to the surfaces. Fig. 25 shows a brake of the single disc type with wooden inserts in the rotating disc.

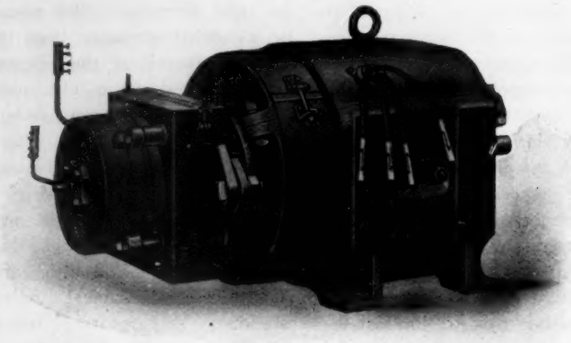


FIG. 24—MULTIPLE DISC BRAKE ON MOTOR.

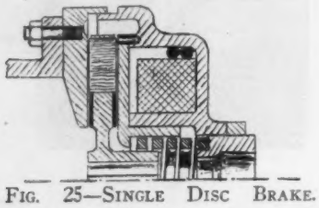


FIG. 25—SINGLE DISC BRAKE.

The conical type consists of one stationary and one rotating friction member with conically shaped friction surfaces. The pressure is increased by the wedging action. Single or double cone shaped surfaces are used and linings are employed in most cases. One brake of this type has cylindrical wooden inserts in the rotating cone, held in position by a cast ring and bolts. No holes are drilled in the wood. The ends of the several pieces are cut to form part of the conical surface.

THE RUDDIMAN COMBINED DUST CATCHER AND GAS WASHER.

A combined blast furnace dust catcher and gas washer are shown in Figs. 1 and 2. This combination not only results in an economy of space at the blast furnace plant, but likewise effects a saving in the cost of installation. The combination, as illustrated, includes a Mullin gas washer, described in THE IRON TRADE REVIEW of Sept. 24, 1908. Fig. 1 is a combined section and elevation through the gas cleaner, while Fig. 2 is a combined plan and sectional view.

Construction.

The external vessel of the apparatus A is provided with a gas outlet pipe F, and D is an inlet pipe for the gas, which projects downward from the vessel A. The pipe D is direct-connected to the downcomer pipe of the blast furnace, and the pipe F is connected to the mains leading to the boilers and stoves. The lower part of A′ of the vessel A forms a chamber for holding water, and a′ is a valve through which the mud is flushed. The dust chamber B is supported in the vessel A, and is provided with a conical lower portion B′, which depends within the water in the vessel A′. Brackets L are arranged between the chambers A′ and B′, and support the chamber B′. The lower part B′ of the dust catcher B is provided with an outlet pipe b′,

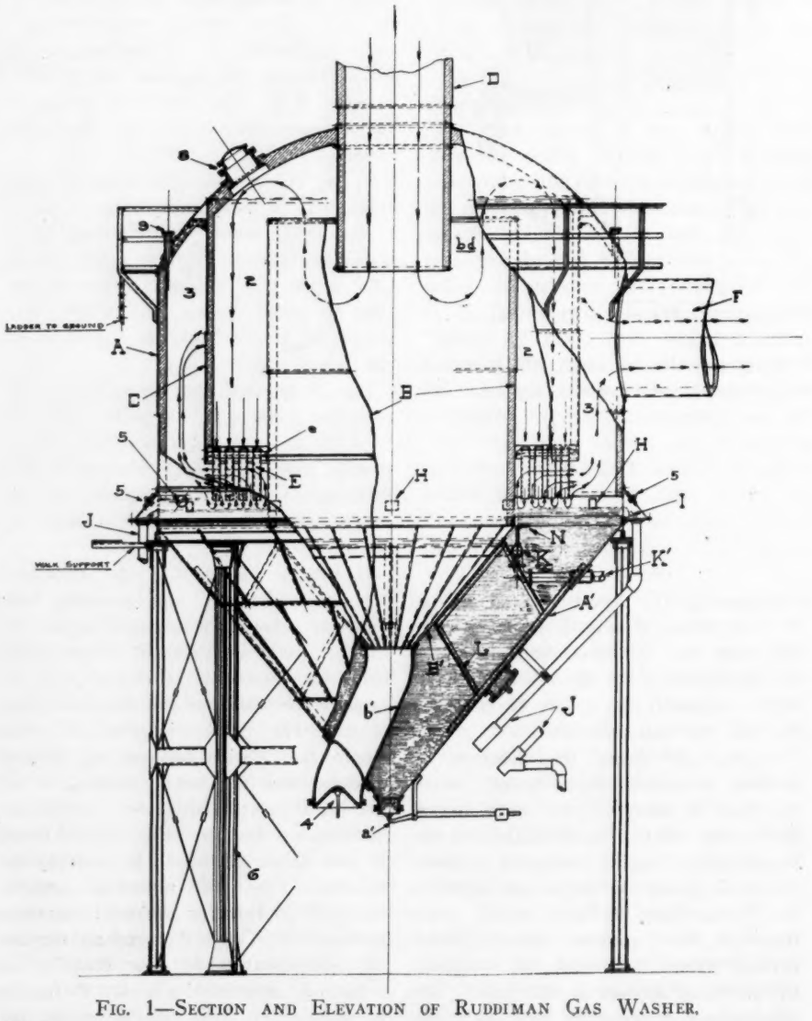


FIG. 1—SECTION AND ELEVATION OF RUDDIMAN GAS WASHER.

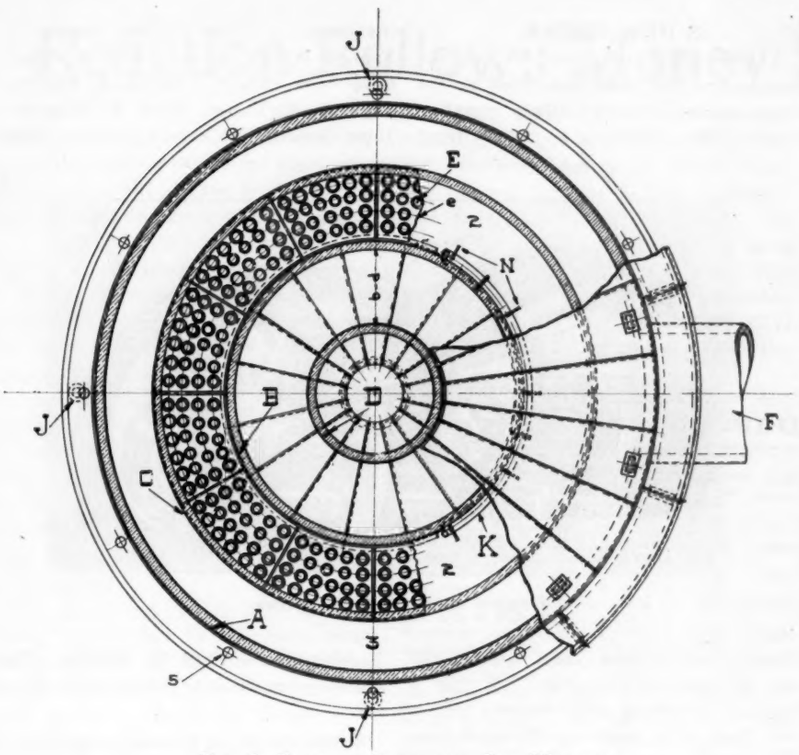


FIG. 2—PLAN OF RUDDIMAN GAS WASHER.

which discharges the dry accumulations through the bottom of chamber A′ and valve 4 to one side of the mud valve. A cylinder C depends from the top of the vessel A around the dust chamber B, which forms two annular chambers 2 and 3. Plates are supported horizontally at the bottom of the inner annular chamber 2, and at E are shown pipes which depend from the plate e, so that their lower ends are near the surface of the water in chamber A′.

Gas Washer.

These pipes are similar to those covered by the B. J. Mullin patents, and divide up the gas into small volumes in a similar manner, but any other method can be used for impinging the gas on the surface of the water contained in the vessel A. The bottom of the pipe D projects into the dust chamber B, the top of which is open and it is arranged below the top of the vessel A, forming the annular passage b d. Scum outlets H, at the periphery of the vessel A, maintain a normal level of water in the lower portion of this vessel a trifle below the bottom of the pipes E. An annular scum chamber I encircles the chamber A over the outlets H, and is provided with hand holes 5. A water seal and inlet pipe J are connected to the scum chamber I, and maintain the water in the latter at a lower level than that of the water in chamber A′. An annular water supply pipe encircles chamber B′, and is provided with a series of jet pipes N, arranged below the level of the water and pointing radially toward the scum outlets H. The pipe K is supplied with water from a main pipe K′. The entire device is supported by columns 6, and at 8 is shown a combined manhole and repair door, while the cleaning ports are shown at 9.

Operation.

In operation the gas enters the dry dust catcher B, the downcomer being connected to the pipe D, and deposits its heaviest dust and coarse material upon the conical bottom B′, which is kept cool by being immersed in water. These dry accumulations are discharged through pipe b′, and valve 4, from time to time. Its course reversed, the gas, with the lighter particles of dust, flows with an even distribution over the top of chamber B, into the annular chamber 2, in the direction as shown by the curved arrows, and is discharged against the surface of the water through the pipes E at a suitable velocity. The clean gas passes between the tubes E into the outer chamber 3, and is discharged through the outlet pipe F. The dust settling in the water is flushed out at valve a′, periodically. The gas moves the scum on the surface of the water toward the outlets H with the aid of streams of water from the radial jet pipes. The scum is carried off continuously with the overflow by the outlet pipe J.

Economies.

The economy of construction is graphically shown in Figs. 3 and 4. At the right of this illustration the dust catcher and gas washer are separately installed with double foundations, supports and extra flue connections, the

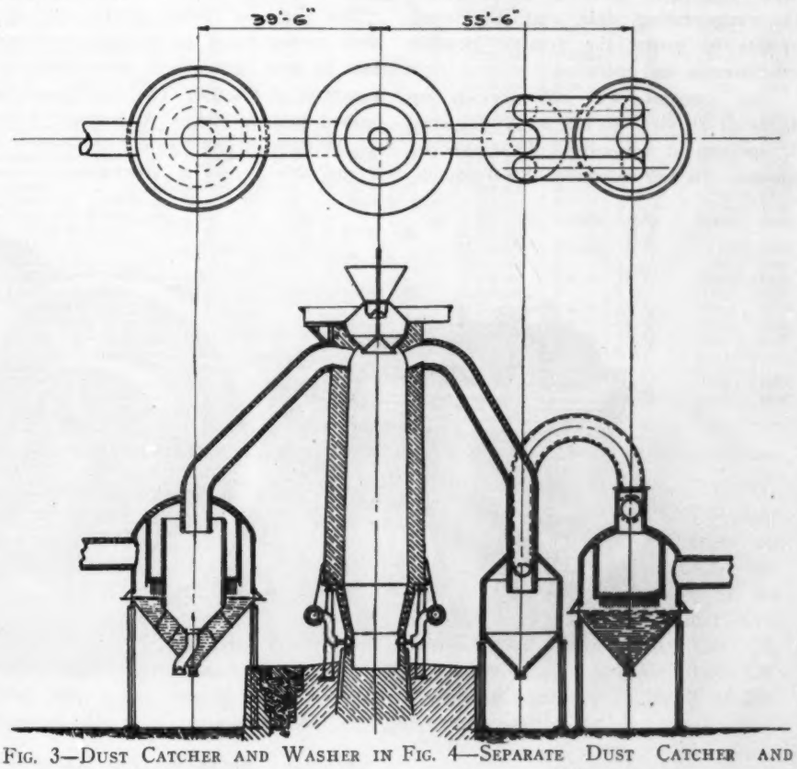


FIG. 3—DUST CATCHER AND WASHER IN SINGLE STRUCTURE.

FIG. 4—SEPARATE DUST CATCHER AND WASHER.

cost of which is reduced one-half by the combined apparatus shown at the left. This device was designed and is built by John Ruddiman, 229 Front street, New York City.

A HEAVY THREAD ROLLING MACHINE.

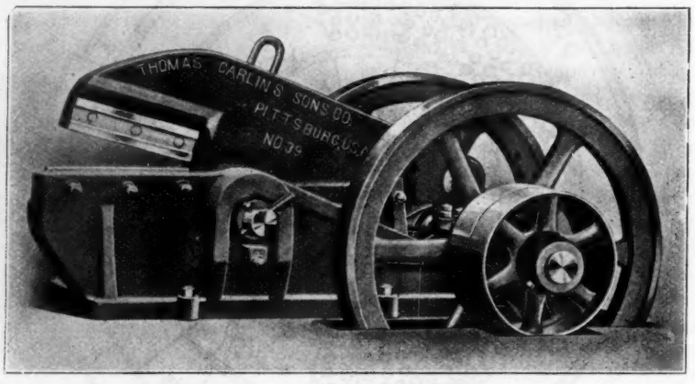
The National Machinery Co., Tiffin, O., manufacturer of bolt and nut machinery, has recently brought out an improved roll thread machine, which is illustrated herewith. This machine is of the reciprocating type, which is a most satisfactory form of roll threader. In attempting to overcome the difficulties generally existing in these machines, this machine was designed along heavy and powerful lines, with slides of large proportions, so that the machine would operate without excessive wear, and give the greatest possible accuracy to the work and long life to the dies. The slide which carries the reciprocating die is long, and is backed by a bank of hardened steel rollers, which greatly reduces the wear upon the various parts, and the power required to operate the machine. This slide is operated by a crank having a Whitworth quick-return movement, so that the machine can be operated at high speed and still allow the operator a maximum of time for feeding.

The machine is thoroughly well built, with removable wearing plates under the reciprocating slide, and the design results in giving the greatest possible effectiveness in operation.

This machine will roll threads on bolts of all sizes to one inch diameter. It operates at a speed of 35 strokes per minute. Its net weight is 18,000 pounds.

A NEW SHEAR.

A new design of shear for medium service has just been completed in the shops of the Thomas Carlin's Sons Co., North Side, Pittsburg. It is direct driven from a crank shaft without the use of intermediate gears. It has a capacity of cutting about 1½-inch square soft steel at a speed of 70 to 80 cuts per minute. The bed plate, lever, fly wheel, pulleys, etc., are of cast iron, the crank shaft of steel and the lever and pitman pins of hammered steel. Although the accompanying cut shows a belt driven shear, this machine is built by the company for either engine or motor drive.

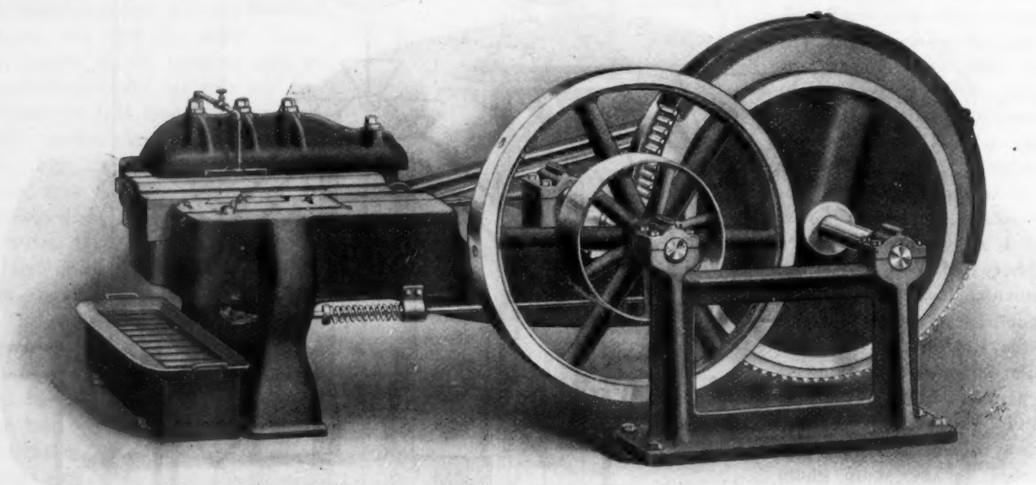


CARLIN DIRECT-DRIVEN SHEAR.

NEW WIRE WEAVING PLANT.

The Spargo Wire Cloth Co. has been incorporated to manufacture and deal in iron, brass and wire cloth on a capital of $50,000. The incorporators named include James A. Spargo, John T. Wiggins, and John Baynes, of Rome, N. Y. The stockholders are the same as those in the Joseph A. Spargo Wire Co., and these directors have been chosen: James A. Spargo, John D. McMahon, John T. Wiggins, John Baynes, William J. Doyle, John E. Mason and Fred M. Shelley. The directors have not chosen officers as yet.

While the cloth is now being woven in the Spargo Wire company's plant, it is the intention, however, next spring to erect a building of steel and concrete, 100 x 200 feet, west of the present Spargo works. The James A. Spargo Wire Co. will manufacture the wire and the Spargo Wire Cloth Co. will weave the wire into cloth. It is proposed that the new cloth will be made of copper, brass or bronze wire, which will not rust or fade. The cloth is largely used by screen manufacturers in advertising purposes. Mr. Spargo, who is at the head of both enterprises, has made a marked success of the business.



NATIONAL THREAD ROLLING MACHINE.

Reaction Follows Money Fluctuations.

A reaction took place during the week which carried some stocks, particularly smelting stocks, to the lowest point for weeks. This was accompanied by an advance in the call money rate to 4 per cent on Tuesday, the highest since last January. The bank situation attracted fully as much attention as the stock market during the week, because of the steady decrease in the surplus reserve. Instead of the surplus reserve being wiped out, as at one time seemed probable, by the end of December, there remains $12,583,000 above legal requirements, whereas a year ago at this time the banks were $31,751,000 below legal requirements. There were no gold exports.

The stock market opened Monday strong and higher in the early transactions, later selling off and losing nearly all gains. The smelting stocks were weakest. Governor Hughes of New York appointed a committee to investigate Wall Street methods. Whereas call loans were 3½ per cent on Monday, they advanced Tuesday to 4 per cent, the stock market being active and irregular, closing lower. Less activity was shown in the market Wednesday; prices were firmer and closed higher. Call loan rates did not exceed 3½ per cent, but time loans were firmer. Sharp reactions occurred Thursday; prices declined from one to five points and the close was lower all around; there was a firmer tendency in money; the grain markets were also weak and lower; depression appeared in foreign markets, but there was no change in foreign bank rates. In spots there were recoveries on Friday, steel stocks recovering and closing steady, after the receipt of Chairman Gary's testimony before the Washington tariff committee. Saturday's activity developed weakness, stocks closing lower all around.

Contrary to previous indications, the bank statement was not so unfavorable. Clearing house banks showed loans decreased $48,111,500; deposits decreased $63,725,600, and the percentage of reserve 26.22, a decrease of 0.02. Non-member banks and trust companies showed loans increased $16,466,600; net deposits increased $14,595,200, and the percentage of reserve 28.5, a decrease of 1.2. The surplus of idle cars reported Dec. 9 showed an increase of 42,814 cars between that date and Nov. 25; of this increase, about 10,000 are accounted for as being returned from repair shops, making the net increase 32,800. Commercial failures for the week were 338, compared with 312 the preceding week and 342 the corresponding week last year. Shares were sold to the number of 5,454,600, compared with 4,918,749 the preceding week and 2,754,746 the corresponding week last year. Bonds, exclusive of government bonds, were sold to the amount of $29,822,000, compared with $38,129,000 the preceding week and $10,987,000 the corresponding week last year.

THE LEADING INDUSTRIAL SECURITIES.

	Closing Quo. Dec. 19	Changes in Week	Date 1908 Ann. M't'g	Stock Outstanding	Dividend Basis	Dividend Last Declared	Dividend Date Last Div. Pay.
Allis-Chalmers	15⅛	− ⅝	Sept. 3	19,820,000			
Allis-Chalmers pr	45⅜	−4		16,150,000	7 cum	1¾ Q.	Feb., 1904
American Can	8⅜	− ⅛	Feb. 3	41,233,300			
Am. Can pr	73	−3⅜		41,233,300	7 cum	1¾ Q.	Oct., 1908
Am. Car & Foundry	46¾	−1¾	June 25	30,000,000		½ Q.	Oct., 1908
Am. Car & Fdy. pr	108			30,000,000	7 n. c.	1¾ Q.	Oct., 1908
American Loc	54⅝	−2⅛	Oct. 20	25,000,000	5	1¼ Q.	Aug., 1908
American Loc. pr	110⅛	+ ⅛		25,000,000	7 cum	1¾ Q.	Oct., 1908
American Ship	56		Oct. 14	7,600,000	4	1 Q.	June, 1908
American Ship pr	105½			7,900,000	7 n. c.	1¾ Q.	Oct., 1908
Am. Steel Foundries. pr.	47⅛		Oct. 6	15,810,000			
Am. Steel Foundries(new	39	−1		14,247,400	6 cum	2¼	Aug., 1904
Barney & Smith	40		June 2	2,000,000	4	1 Q.	Sept., 1907
Barney & Smith pr	110			2,500,000	8 cum	2 Q.	June, 1908
Bethlehem Steel	21	−2	April 7	14,862,000			
Bethlehem Steel pr	51	− ¼		14,908,000	7 n. c.	¾ Q.	Feb., 1907
Cambria Steel	38⅛	−1⅛	March 17	45,000,000	6	1½ S. A.	Aug., 1908
Cambria Iron	46⅛	− ⅛		8,468,000*	4	2 S. A.	Sept., 1908
Chicago Pneumatic Tool	25	− ⅞	Feb. 17	6,145,800	4	1 Q.	Oct., 1907
Colorado Fuel	37⅛	−2	Oct. 19	34,235,500		3½	April, 1902
Crucible Steel	8	− ⅝	Oct. 21	24,578,400			
Crucible Steel pr	57⅝	−1½		24,436,500	7 cum	1 Q.	Dec., 1907
Empire Steel	6		Feb. 26	1,254,770			
Empire Steel pr	47			2,500,000	6 cum	3 S. A.	July, 1908
Fay & Egan	90		Feb. 18	1,000,000	6	1¾ Q.	Nov., 1908
Fay & Egan pr	100			1,000,000	7 cum	1¾ Q.	Nov., 1908
General Electric	157	−1	May 12	65,167,000	8	2 Q.	Oct., 1908
Harbison-Walker	16¼	− ⅜	Jan. 20	18,000,000		½	Oct., 1907
Harbison-Walker pr	80			9,600,000	6 cum	1½ Q.	Oct., 1908
International Pump	32⅝	+ ⅜	June 2	17,787,300		1	April, 1905
International Pump pr	80	−2		13,835,000	6 cum	1½ Q.	Nov., 1908
Lackawanna Steel	45	−3	March 11	34,971,400			
Lake Sup. Corp	13⅞	+ ⅞	Oct. 7	40,000,000			
New York Air Brake	87	−5⅝	June 18	8,012,500	8	2 Q.	Oct., 1907
Niles-Bement-Pond	97		Feb. 5	8,500,000	6	1½ Q.	Dec., 1908
Niles-Bement-Pond pr	100			2,000,000	6 cum	1½ Q.	Nov., 1908
Otis Elevator Co.	40	+1	March 16	6,156,600		1½ S. A.	April, 1908
Otis Elevator Co. pr	94			5,449,500	6 n. c.	1½ Q.	Oct., 1908
Penn. Steel	50		May 11	10,750,000			
Penn. Steel pr	104			16,500,000	7 n. c.	3½ S. A.	Nov., 1908
Pittsburg Coal Co.	14	− ¼	Feb. 10	28,853,400			Nov., 1906
Pittsburg Coal Co. pr	49¾	+1¾		27,030,800	7 c.	1¾	April, 1905
Pressed Steel Car	41⅛	−2	Feb. 19	12,500,000		3	Aug., 1904
Pressed Steel Car pr	99⅛	+ ⅛		12,500,000	7 n. c.	1¾ Q.	Nov., 1908
Pullman	169½	−3	Nov. 11	100,000,000	8	2 Q.	Nov., 1908
Railway Stl. Spring	47	+3	March 5	13,500,000	4	2 S. A.	Oct., 1908
Railway Stl. Spring pr	100	−1¾		13,500,000	7 cum	1¾ Q.	Sept., 1908
Rep. Iron & Steel	25	−1½	Oct. 21	27,191,000			
Rep. Iron & Steel pr	85⅛	− ⅛		20,416,900	7 cum	1¾ Q.	April, 1908
Sloss-Sheffield	77	−1	March 11	10,000,000	5	1 Q.	Dec., 1908
Sloss-Sheffield pr	110			6,700,000	7 n. c.	1¾ Q.	Sept., 1908
U. S. Pipe & Fdy	28	−2⅜	June 24	12,500,000	4	1 Q.	Dec., 1907
U. S. Pipe & Fdy pr	75¾	− ¾		12,500,000	7 n. c.	1¾ Q.	Sept., 1908
U. S. Steel	52¾	−1¾	April 20	508,302,500	2 n. c.	½ Q.	Dec., 1908
U. S. Steel pr	111⅞	− ⅞		360,281,100	7 cum	1¾ Q.	Nov., 1908
U S. Steel 5s	102¼	− ⅛		463,798,000	5	5 A.	
Va. Iron, Coal & Cke	62¼	−1¾	Nov. 17	9,073,680			
Westinghouse Elec	86½	−2	June 24	23,933,200	10	2½ Q.	Oct., 1907
Westighouse Air Brake	109	−3	Oct. 6	14,000,000*		2½ Q.	Oct., 1908

Par value of shares, $100, except those starred (*), $50

Copper Stocks.

New York.—Amalgamated Copper closed 78¾, a net loss of 4¾.

Boston.—Butte Coalition closed 26, a net loss of 1; Calumet & Arizona closed 116, a net loss of 2; Calumet & Hecla closed 665, a net loss of 10; North Butte Mining closed 81¾, a net loss of 2⅜; Quincy Mining closed 93, a net loss of 2.

Financial Notes.

The Union Switch & Signal Co. declared the usual quarterly dividend of 3 per cent on both common and preferred stock, payable Jan. 11; the American Locomotive Co., the regular quarterly dividend of 1¾ per cent on preferred stock, payable Jan. 21; the New York Air Brake Co. took no action on the dividend, the last dividend being 2 per cent on Oct. 22, 1907; the Westinghouse Air Brake Co. the regular quarterly dividend of 2½ per cent, payable Jan. 9.

NEWS FROM MANY INDUSTRIES

New Buyers:—

Grant D. Green, Thomas Van Ornam and George D. Chapman have incorporated the Empire Foundry Co., Syracuse, N. Y., with $40,000.

The Revere Draft Furnace Co., Akron, O., has been incorporated by G. D. Renfield, H. J. Hough, Ray Cook, S. S. Osborne and L. H. Horner, with $20,000 capital stock.

The Star Foundry Co., Seattle, Wash., has filed application for a charter with $6,000 capital stock. Clarence H. Reed, Clyde R. Dodds and Doris R. Dodds are the incorporators named.

The Sharp Machine & Tool Co., Toledo, O., has been incorporated with $10,000 capital stock. William J. Sharp, Annie F. Sharp and Harold Fitkin are the incorporators.

The Acme Machine Tool Co., Cincinnati, O., with an authorized capital of $100,000, has been incorporated by C. H. M. Atkins, E. N. Atkins, J. H. Williams, B. B. Quillen, and W. H. Burtner Jr.

The Electro-Magnetic Tool Co., Monadnock block, Chicago, has been chartered by O. R. Barnett, P. H. Truman and H. L. Peck to manufacture electrical devices and tools, with $50,000 capital stock.

The Northern Railway Supply Co., 215 Commercial avenue, Chicago, has been incorporated to manufacture railway supplies by John F. O'Malley, Herbert W. Drew and A. W. Neudeck. The capital is placed at $5,000.

The Russell Harvesting Machine Co., Ltd., Woodstock, Ont., has been incorporated with an authorized capital of $250,000. The provisional directors are William Russell, James F. Russell and John T. Burns.

Articles of incorporation have been filed by the Mull & Mull Mfg. Co., The Rookery, Chicago, to manufacture machinery and mechanical devices, with $10,000 capital stock. J. M. Griffen, N. B. Hall and G. Moulton are the incorporators.

Articles of incorporation have been filed by the Terry Core Drill Co., Hastings-on-the-Hudson, N. Y., to manufacture core drills and machinery. The company is capitalized at $100,000, and has these incorporators: Coleman A. Terry, 518 West 151st street, New York City; Frederick Snare, Englewood, N. J., and Arthur W. Buttenheim, Madison, N. J.

The F. H. Niles Car Co., 184 La Salle street, Chicago, has been incorporated to manufacture railway equipment and supplies, with $50,000 capital stock. The incorporators are: Edwin Terwilliger Jr., Edward D. Pray and A. Hendrickson.

The Commercial Dump Car Co., Chicago, with an authorized capital stock of $100,000, has been incorporated by George W. Holmes, S. L. Page, Jesse B. Hawkins, Backburn Esterline and Edward W. Everett, all of Chicago.

A. J. Deer Co., Inc., Hornell, N. Y., to manufacture motors, electric machinery and dynamos, has been incorporated with $120,000 capital stock, by Arthur J. Deer, 62 Pearl street, Buffalo; Frank Bartz and Frederick A. Wygant, Hornell, N. Y.

The Syracuse Die Molded Casting Co., Syracuse, N. Y., has been granted articles of incorporation to manufacture die molded castings, with $100,000 capital stock. O. Milton Gale, Orla E. Stowell and Lila H. Johnson, Syracuse, N. Y.

The W. H. Holt Mfg. Co., Providence, R. I., was granted a certificate of incorporation for the purpose of manufacturing machinery. The capital stock is $40,000 and the incorporators are: Frank Holland, William H. Holt and Louis D. Richardson.

Boynton & Plummer, Inc., Worcester, Mass., to manufacture and sell machinery of all kinds, has been incorporated with $40,000 capital stock by Ernest F. Hidgson, Dover, Mass., William H. Wilder and Paul Wilder, Gardner Pass, Mass.

The Lawson Mfg. Co., Buffalo, has filed application for a charter to manufacture machinery and tools, with a capital of $25,000. The incorporators are Charles G. Lawson, Albert F. Lawson and Eugene G. Zacher, Buffalo.

Articles of incorporation have been filed by the Crescent Emery Corundum Wheel Co., Indianapolis. The directors of the company are: Robert O. Rupert Sr., Robert O. Ruper Jr., Chester G. Browne, Joseph E. Elliott Jr., and Horace C. Stilwell.

Incorporation papers for the Raber & Lang Mfg. Co., Kendallville, Ind., have been filed, showing $50,000 capital. The company will manufacture a large line of machinery. Oliver P. Raber, Ralph L. Raber and John E. Lang are the principal stockholders and directors.

A charter has been granted Adall & Co., New York City, to manufacture adding and calculating machines, with $110,000 capital stock. The incorporators are E. R. Chapel and L. D. Garrett, 84 William street, and Robert K. Waller, 80 Wall street, all of New York City.

A charter has been granted the Leddell-Bigelow Co., New York City, to manufacture and deal in metals, alloys and metal products, with $60,000 capital stock. The incorporators are: William J. Leddell and Richard Bigelow, 18 Broadway, and Jessie Ashley, 5 Nassau street, all of New York City.

The Hyle Spring Hub Co., Buffalo, has been granted a charter to manufacture motors, engines, machinery, cars, etc., with $150,000 capital stock. William A. Hyle and Blinn Yates, 138 Ellicott Square, Buffalo, and Vernon E. Peckham, Jamestown, N. Y., are the incorporators.

The Larsen Machine Co., Brooklyn, N. Y., has been incorporated to manufacture shoe sewing machinery, with $400,000 capital stock. The incorporators are Louis Nungesser Jr., 257 Fenimore street; Waldemar Knust, 715 East Twenty-second street, and Hans E. Zobel, 505 East Ninth street, all of Brooklyn.

New Construction:—

The United Iron & Steel Co. is repairing its Fannie stack, West Middlesex, Pa. The stack has been raised and 10 feet added at the top.

The Giese Mfg. Co., Grand Island, Neb., is planning for the construction of a foundry and machine shop, and contracts will be let shortly.

The improvements at the Ella stack, West Middlesex, Pa., of Pickands, Mather & Co., have been begun by the Meehan Boiler Co., Lowellville, Pa.

The Standard Boiler & Plate Iron Co., Niles, O., is erecting at the Consolidated works of American Steel & Wire Co, Cleveland, two self-supporting steel stacks 160 feet high.

The Cascade Foundry Co., Erie, Pa., is having plans prepared for an addition 80 x 100 feet to its foundry at Nineteenth and Plum streets, of brick, concrete and steel, one and one-half stories.

Ground has been broken at Ensley, Ala., for the erection of an electric repair shop, 40 x 70 feet, for the blast furnace department of the Tennessee

Coal, Iron & Railroad Co. It is expected that the shop will be completed Feb. 1, and it will be equipped with all the appliances for repairing all kinds of electric work and machinery.

The Seattle Electric Co., Seattle, will build a small foundry to do repair work and cast brake shoes at its general repair shops at Georgetown, a suburb of Seattle.

The Union Iron Works, Spokane, advises that the new boiler shop which it expects to erect will not be built this winter but early in the spring.

The Vulcan Iron Works, West Pittston, Pa., has nearly completed its new buildings, and is running its plant now on full time on the execution of several large contracts.

The Maysville Foundry & Engineering Co., Maysville, Ky., is constructing an additional building to its plant and making other improvements in order to enlarge its sphere of manufacture.

The Duncan Foundry & Machine Co., Peoria, Ill., is erecting a new structure 120 x 160 feet, to be used as a foundry, at Seventh and Piasa streets. The company plans to enlarge its capacity as well as widen its field of manufacture.

The foundation for the new building for John A. Roebling's Sons Co., at St. Clair avenue near East Sixth street, Cleveland, is being put in, and other contracts pertaining to the building are being let.

Directors are now figuring on plans for the erection of the repair and machine shops to be built at Cliffs, Wash., by the Spokane, Portland & Seattle railroad. Work will be begun on the shops at an early date.

The Peter Boller Machine Works, 20 West Randolph street, Chicago, is receiving figures on a machine shop to be built at 11 Curtis street, two stories, 55 x 115 feet, brick with composition roof, at an estimated cost of $20,000.

Joseph Rothe has started the construction of a new foundry at Green Bay, Wis., that will be 80 x 120 feet and 34 feet high, of reinforced concrete. The foundation is being built this winter, and early next spring building will be resumed.

The Sioux City Foundry & Mfg. Co., Sioux City, Ia., has begun the erection of a foundry, warehouse, boiler shop, machine shop and offices, which it plans to have ready for occupancy by April 1. The three buildings on which work has been commenced, are fireproof, concrete and steel construction, and the warehouse will be two stories, 75 x 100 feet. The foundry and boiler shop will have like dimensions. The Great Northern railroad recently put in a switch track for material delivery. An eight-ton punch will be added to the equipment, as well as a friction saw. Further plans contemplate the erection of a structural steel yard next summer. The new plant, according to President M. P. Smith, will turn out heating furnaces, structural iron and steel, boiler and sheet iron products and water works equipment.

General Industrial:—

The Sanford Concrete Machinery Co., Toledo, has increased its capital stock from $10,000 to $60,000.

The Standard Chain Co., Pittsburg, advises that the fire at its Carlisle, Pa., plant did little damage, and repairs have already been completed.

The Whiting Foundry Equipment Co., Harvey, Ill., is installing a five-motor, 20-ton electric traveling crane in the new steel car works of the Pullman Co., Pullman, Ill.

The Rogers Iron Mfg. Co., Muskegon, Mich., manufacturing saw mill machinery, advises that the fire reported at its plant did no damage, and the plant is running as usual.

The Lebanon Chain Works, Lebanon, Pa., Eli Atwood, president, has been notified by the government that it has been awarded two large contracts for chain to be used in the Panama canal construction.

The Des Moines Mfg. & Supply Co., Des Moines, Ia., which has been engaged in business for 20 years, has changed its name to the McDonnell Boiler & Iron Works. President N. S. McDonnell, of the company, is quoted as saying that plans are being prepared for the enlargement of the plant.

Arthur Letherby has purchased the interest of Philip Fosdick in the Kern Machine Tool Co., of Cincinnati. Mr. Letherby, who was for a number of years superintendent of the Hamilton Machine Tool Co., will become vice president of the Kern company, and will assume his new duties Jan. 1.

The Eagle Brass Foundry, Seattle, moved Dec. 1 to Railroad avenue and King street. The old location was Eighth avenue and Plummer street. The Puget Sound Pattern Works, Seattle, has moved from 1000 First avenue S to 1037 Railroad avenue, where larger and better shops have been secured.

The exhibition test of the high pressure fire line recently installed at the plant of the Upson Nut Co., Cleveland, was given a few days ago by the aid of a city fire tug, and the results were pronounced highly satisfactory. By the system, one tug can supply water from the Cuyahoga river for 20 lines of hose.

The Penn Steel Castings Co., Chester, Pa., has received a contract from the New York Ship Building Co. to make the castings for the battleship Utah, newly ordered by the government. The castings will aggregate about 1,000,000 pounds of steel and their manufacture will cover a period of about two years.

Rhodes, Curry & Co., Ltd., Amherst, N. S., advise that their building recently destroyed by fire was a passenger erecting shop, 190 x 318 feet. The company is now erecting a new building the same size, and expects to have it completed about the middle of January. None of the buildings containing machinery was damaged.

McGinty & Reynolds, proprietors of the Iowa Machine Works, Clinton, Ia., have purchased the Clinton Novelty Iron Works and have consolidated the two plants at the former headquarters of the Novelty company. This makes one of the largest and most complete foundries and machine shops in that section of the state of Iowa.

Contracts have been let by the Cedarburg Foundry Co., Cedarburg, Wis., for rebuilding the foundry recently destroyed by fire. The new building will be 60 x 85 feet, of cement block construction, and is expected to be ready for occupancy Jan. 15. New machinery will be installed throughout, and when completed, it will be a thoroughly modern plant.

Officers of the recently organized Columbian Iron Works, Chattanooga, Tenn., which holds an option on the Herron Pump Works, advise that by the first of the year the pump works will have been taken over by the new company. A number of side lines will be manufactured in connection with the plant operation, such as saw mills and planing mills.

The Norfolk Iron & Wire Works, Norfolk, Va., advises respecting its recent incorporation that it has been doing business for three years as a partnership, and has incorporated for convenience and protection. It will occupy its present buildings and will not put in any new machinery. Its business is principally ornamental iron and wire and some structural work.

The Peerless Motor Car Co., at its recent annual meeting at Lansing, Mich., re-elected its officers and directors and listened to an encouraging

report of business the past year. In that year the company has doubled its capacity by building and equipping an addition to its plant, has doubled its force of men, and has landed a $1,000,000 contract that will require 10 years of work to complete.

The Jackson Brass Foundry Co., Jackson, Mich., which was recently incorporated with a capital of $2,500, has established a plant at the rear of 101-113 East Cortland street for the manufacture of high grade brass castings. The officers of the company are: President, W. W. Wright; vice president, J. Albert Johnson; secretary and business manager, J. Joseph Johnson, and foundry manager, David D. Tracy.

The Hallidie Machinery Co., Seattle, recently received two good orders for machine tools. One is from the Foley-Welch-Stewart Co., Prince Rupert, B. C., for a contractor's machine shop, comprising three engine lathes, drill press and minor tools. The Davidson Ward Co., located in the same territory, has also ordered several machine tools for a saw mill. These include a gap lathe, a 24-inch shaper and a drill press.

The General Machine Works, York, Pa., recently organized, has acquired by purchase the plant and equipment of the Ruth Machine Co., York, Pa. It is the intention of the new corporation to continue the manufacture of rib knitting machinery and other devices, and to add such improvements as may be demanded. The new company advises that there will be no new building or installation of new machinery at this time.

At the recent annual meeting of the York Mfg. Co., York, Pa., the following officers and directors were elected: President, W. L. Glatfelter; vice president and general manager, Thomas Shipley; secretary and treasurer, B. H. Loucks, who together with A. B. Strickler, constitute the board of directors. Encouraging reports from last year were read, and the annual dividends were paid. Improvements to the plant were decided upon.

Advices received from Rangoon, Burma, are to the effect that the new lift bridge across the Ngawun is completed and open for railroad traffic. The bridge was designed by the Scherzer Rolling Lift Bridge Co., of Chicago and New York, and is the largest bridge constructed in Burma, having a movable span 220 feet long. The total length of the bridge is 820 feet. The material was manufactured in England and erected in Burma under the charge of the Scherzer company's engineers.

The Detroit Saw & Tool Works, Detroit, Mich., manufacturer of saws, dies, gears, etc., advises that the recent fire damaged the second and third floors of its machine and tool departments, but that most of the damage was by water and smoke, as none of the machinery was destroyed. Since only little damage was done to the building, it required only a small quantity of new material, which it has purchased, and it is now in a position to take care of orders.

The Standard Pattern Works Co., with $10,000 capital stock, has been organized to take up the business conducted by C. Birnbaum under the name of the Standard Pattern Works, 5333-37 St. Clair avenue, N. E., Cleveland. The officers of the company are: President and treasurer, C. Birnbaum; vice president and general manager, D. J. Gutman, and secretary, W. Birnbaum. The new company has placed orders for additional machinery to facilitate the workings of the plant. It has considerable business on the books at present, and inquiries are coming in very much better now than a few weeks ago. With the completion of the installation of the new tools proposed, this plant will be one of the largest of its kind in the country.

The A. R. Milner Seating Co., Canal Dover, O., which was recently incorporated with a capital of $100,000, was organized recently by the election of the following officers: President, A. R. Milner, Canal Dover; vice president, George Williams, Cleveland; treasurer, Thomas Rogers, Cleveland; secretary, C. O. Waltz, Alliance, O., who, together with James Ries, of Canal Dover, and W. E. Seibert, of New Philadelphia, compose the board of directors. The company has secured two acres of land, and will erect three manufacturing buildings, 30 x 100 feet, and a foundry 80 x 100 feet, of concrete construction, estimated to cost $30,000. Construction will begin at once. The company was organized to manufacture an automatic school desk, opera chair and postoffice assorting rack, upon which it holds patents.

Trade Notes:—

Schuchardt & Schutte, the well-known machinery house of Berlin, Vienna, Stockholm, St. Petersburg, Copenhagen, Budapest, London, New York and Shanghai, announce that they have opened a branch under their own name for the sale of machine tools, woodworking machines and small tools at 14 Akashicho Tsukiji, Tokio, Japan, under the management of James G. Brown, who has spent several years in the far east in the interests of this firm.

Fires:—

The loss on the plant of the Columbus Bolt Co., Columbus, O., on Dec. 7, has been placed at $10,000.

The damage to the plant of A. Burlingame Co., Worcester, Mass., engines, steam heating apparatus, etc., on Dec. 8, is placed at $15,000.

The machinery depot of Rogers & d'Artenay Mfg. Co., Sacramento, Cal., was badly damaged, Dec. 8, the loss on machinery, tools, etc., being placed at $10,000, partially covered by insurance.

TRADE PUBLICATIONS.

WOOD WORKING MACHINERY.—The Crescent Machine Co., Leetonia, O., has issued its 1908 catalog describing a number of new machines, including a double-spindle shaper, a planer and matcher, a boring machine and two new sizes of planers. The catalog comprises 65 6 x 9-inch pages, well illustrated and handsomely printed.

IRON AND STEEL.—The W. G. Hagar Iron Co., formerly the Western Iron & Supply Co., St. Louis, has issued its illustrated catalog No. 5. This is a comprehensive volume of 532 6 x 8½-inch pages, bound in cloth and illustrated. It lists a great number of iron and steel specialties, tools, etc., including pipe fittings, valves, lubricators, steam engine governors, injectors, hose couplings, pipe tools, hand tools, forges, punches, hoists, bolts, nuts, shafting, cold rolled iron and steel, plates, boiler tubes, etc. The last 50 pages of the catalog contain tables of general information, which will be found of use in ordinary practice. They comprise weights, capacities of pipe, power of belts, capacities of pumps, properties of steel, wire gages, weights, specific gravities, etc.

REAMERS.—The Cleveland Twist Drill Co., Cleveland, is distributing catalog 36, describing Peerless reamers of various types, including expansion, chucking, core and shell core reamers, together with arbors for shell reamers. Tables of sizes and prices are presented in connection with each type.

SAFETY VALVES.—The American Steam Gage & Valve Mfg. Co., Boston, is distributing its 1908 catalog illustrating various types of safety valves, including the American special pop valve, outside spring pop valves, duplex and triplex pop valves, marine safety valves and safety valves for various other services, such as house heating, hydraulic relief valves, spring heater valves, locomotive valves, car heater valves, etc. Included in the book are the rules and regulations of the United States board of supervising inspectors of steam vessels, relating to safety valves.

CURVE-DRAWING INSTRUMENTS FOR ELECTRIC CIRCUITS.—Bulletin No. 4627, issued by the General Electric Co., Schenectady, N. Y., contains matter descriptive of the company's curve drawing instruments for alternating and direct-current circuits. The bulletin contains also connections, dimension diagrams and prices.